

2016 DATA SUMMARY REPORT Ballard, Enoch Valley, and Henry Mines Remedial Investigation Activities

DRAFT

Revision 0

January 2017

prepared for

P4 PRODUCTION, LLC

2016 DATA SUMMARY REPORT
BALLARD, ENOCH VALLEY, AND HENRY MINES REMEDIAL
INVESTIGATION ACTIVITIES
LONG-TERM GROUNDWATER AND SURFACE WATER MONITORING
DRAFT
Revision 0

JANUARY 2017

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P4 PRODUCTION, LLC

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ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order of Consent
A/Ts	Agencies and Tribes
BLM	Bureau of Land Management
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CO	Consent Order
COPC	constituents of potential concern
COPEC	constituents of potential ecological concern
CVS	calibration verification standards
DOI	Department of the Interior
DSR	Data Summary Report
FSP	field sampling plan
HASP	health and safety plan
ICAL	initial calibration
ICV	initial calibration verification
IDEQ	Idaho Department of Environmental Quality
IS	Internal standard
LCD	laboratory control duplicate
LCS	laboratory control sample
LDC	Laboratory Data Consultants
LTM	long-term monitoring
MWH	MWH Americas, Inc.
MS/MSD	matrix spike/matrix spike duplicate
P4	P4 Production L.L.C.
QAPP	Quality Assurance Project Plan
QC	quality control
RI/FS	Remedial Investigation/Feasibility Study
RLs	reporting limits
SAP	Sampling and Analysis Plan
SOW	Statement of Work
SOP	Standard Operating Procedure

ACRONYMS AND ABBREVIATIONS CONTINUED

Tribes	The Shoshone-Bannock Tribes
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service

1.0 INTRODUCTION

This 2016 Data Summary Report (DSR) was prepared by MWH Americas, Inc. (MWH) on behalf of P4 Production, LLC (P4), in accordance with the requirements of the Administrative Settlement Agreement and Order on Consent/Consent Order for Remedial Investigation/Feasibility Study (2009 CO/AOC; USEPA, 2009). The 2009 CO/AOC is a voluntary agreement between P4 and the United States Environmental Protection Agency (USEPA), the Idaho Department of Environmental Quality (IDEQ), the United States Department of Agriculture, United States Forest Service (USFS), the United States Department of the Interior (DOI), United States Bureau of Land Management (BLM), and the Shoshone-Bannock Tribes (Tribes). Collectively, the cooperating agencies are referred to as the Agencies and Tribes (A/Ts). The 2016 DSR supports the comprehensive mine-specific Remedial Investigation/Feasibility Studies (RI/FS) that are being conducted at each of P4's three historic phosphate mines: Ballard Mine, Henry Mine, and Enoch Valley Mine, collectively known as the "Sites".

This 2016 DSR documents the most recent spring and fall groundwater and surface water sampling rounds conducted as part of the long-term monitoring (LTM) at the Sites and includes descriptions of the field activities and summarizes the results from those sampling efforts. **Figure 1-1 - P4 Mines Vicinity Map** depicts the footprint of each Site and its geographic relationship with the other Sites.

1.1 Report Description and Objectives

This report is intended to fulfill the requirements for reporting data consistent with a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) RI and Task 3c of the Statement of Work (SOW) attached to the 2009 CO/AOC. Consistent with the SOW, the 2016 DSR documents the investigative activities that were conducted during the 2016 field season and provides a summary of collected data. Complete data packages and field forms are provided as appendices to the DSR. Data are presented herein with little to no interpretation as the combined data sets for each Site have been, or will be, evaluated in the individual Ballard, Henry, and Enoch Valley Mines RI and FS Reports. The purpose and objectives of the 2016 RI/FS monitoring activities are further discussed below.

1.1.1 2016 Surface Water and Groundwater Sampling

Based on the A/Ts' request made during the review of the *Proposed P4 Long-Term Surface Water and Groundwater Monitoring Plan Memo - Final Rev 1*; (MWH, 2014a), a comprehensive LTM sampling and analysis plan (SAP) was prepared in early 2015 for the Sites' surface and groundwater monitoring activities. The revised SAP entitled *Sampling and Analysis Plan for Long-Term Monitoring of Surface Water and Groundwater Ballard, Henry, and Enoch Valley Mines – Final Revision 1 (2015 LTM SAP)*; (MWH, 2015) was submitted to the A/Ts for final approval on April 10, 2015. The 2015 LTM SAP includes a Field Sampling Plan (FSP), Quality Assurance Project Plan (QAPP), and Health and Safety Plan (HASP), and is a stand-alone document that guides the surface water and groundwater

LTM program for the Sites through the next five year period, unless superseded by another document. The objectives, methods, and procedures for surface water and groundwater sampling conducted in 2016 (and reported herein) are described in the *2015 LTM SAP* and were followed for the two 2016 sampling events.

In addition to fulfilling objectives established in the *2015 LTM SAP*, the 2016 surface water monitoring event included collection of two additional surface water samples from ponds located on the Ballard Mine Site as further described in Section 2.0. The collection of these additional samples were a one-time collection event, pending results, and currently are not part of the LTM program.

1.2 Report Organization

The content of this DSR is as follows:

- Section 1.0 – Introduction
- Section 2.0 – Summary of 2016 Field Activities
- Section 3.0 – Summary of 2016 Analytical Results by Mine Site
- Section 4.0 – References

2.0 SUMMARY 2016 FIELD ACTIVITIES

This section discusses the surface water and groundwater sampling program at the Sites and data collection activities during the 2016 field events. Further evaluation of the data is reserved for the individual Site RI and FS Reports and not presented herein. The RI Report for the Ballard Mine entitled *Ballard Mine Remedial Investigation Report, Final Revision 2 (Final Ballard RI Report; MWH, 2014b)* is complete and used data that were collected through 2012. The RI Report for the Henry Mine (*Draft Henry RI Report; MWH, 2016*), currently under review, uses data that were collected through 2014. Therefore, future data collected from the Ballard and Henry Sites, including the 2016 presented herein, will be used as baseline data until the selected remedy for these Sites is in place and the trends of data collected pre- and post-remediation can be compared. The 2016 data collected at the Enoch Valley Site will be included in its RI Report because its preparation has not begun.

A summary of analyte exceedances from the spring and fall sampling rounds is organized by individual Site and is provided in Section 3.0. All field activity forms (including field sampling forms, chains of custody, sampling field note book copies, sampling parameter measurements, and any other relevant field data) are provided in **Appendix A**.

2.1 2016 Surface Water and Groundwater Sampling Activities

Surface water and groundwater sampling was conducted during the spring and fall of 2016 as described in the *2015 LTM SAP*. The surface water and groundwater sample locations for the Ballard Mine, Enoch Valley Mine, and Henry Mine sites are depicted on **Figure 2-1**, **Figure 2-2**, and **Figure 2-3**, respectively.

Spring Sampling. Surface water and groundwater samples were collected from sampling locations at each Site between May 9 and 16, 2016, including the following numbers for each Site:

- Ballard Site: 17 surface water and 22 groundwater samples
- Enoch Valley Site: 10 surface water and 14 groundwater samples (one surface water location [MST269] and three groundwater locations [MBW107, MBW112, and MMW012] were dry)
- Henry Site: seven surface water and five groundwater samples (one surface water location [MST051] and one groundwater location [MBW152] were dry)

Fall Sampling. In accordance with rationale set forth in the *2015 LTM SAP*, surface water samples were collected at each Site, on September 27, 2016, in the following numbers at each mine site:

- Ballard Site: four surface water samples (one surface water location [MSG004] was dry). In addition, two additional surface water locations were sampled as shown (in purple) on **Figure 2-1** (described in Section 2.2. below).

- Enoch Valley Site: three surface water samples (two surface water locations [MDS025 and MST144] were dry)
- Henry Mine: three surface water samples (one surface water location [MDS034] was dry)

Spring and fall surface water samples were collected using the protocols outlined in SOP-NW-9.1, *Collection of Surface Water Samples*. Surface water flow measurements were collected according to the methods presented in SOP-NW-9.2a, *Surface Water Flow Measurements Using Man-Made Portable Devices or Estimation Techniques*. Both of these Standard Operating Procedures (SOPs) are included in the *2015 LTM SAP*.

Spring groundwater samples were collected using the protocols outlined in SOP-NW-5.3, *Collection of Groundwater Quality Samples* and the SOP, *Low Stress Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells*. Both of these SOPs are included in the *2015 LTM SAP*.

As described in the *2015 LTM SAP*, the LTM program for groundwater does not include fall sampling. Therefore, no groundwater samples were collected during the Fall 2016 sampling round. Summaries of surface water and groundwater constituents of potential concern/constituents of potential ecological concern (COPC/COPEC) exceedances based on the appropriate regulatory standards for the 2016 program are provided in Sections 3.1 and 3.2.

2.2 2016 Surface Water and Groundwater Program Changes from 2015

Two additional surface water samples were collected during the 2016 fall sampling round from two ponds on the Ballard Mine Site (SEPond and NWPond, refer to **Figure 2-1**). These samples were collected, as requested by the A/T in an email dated September 12, 2016, to address a potential data gap along Wooley Valley Creek in the reach between MST093 and MST092. Collection of these surface water samples was a one-time collection event, and currently they are not part of the LTM program. Further discussion of these results is provided Section 3.4.

2.3 Work Plan Deviations

There were no deviations from the *2015 LTM SAP* for the spring or fall 2016 sampling events.

3.0 SUMMARY OF 2016 ANALYTICAL RESULTS BY MINE SITE

This section presents the exceedances of COPC/COPEC screening levels in the results from analyses of surface water and groundwater samples collected during the 2016 field activities. The screening levels included in this DSR are derived from promulgated federal and state chemical-specific primary and secondary standards. Evaluation of the COPCs/COPECs has been or will be evaluated in greater detail in the exposure scenarios presented in the Baseline Risk Assessments (BRAs) prepared for each Site. The BRAs evaluate and determine the risks posed by individual constituents and combined constituent exposures. The comprehensive results for all 2016 analytical data presented herein, as well as a copy of the screening levels in **Table B-2**, are provided in **Appendix B**.

3.1 Surface Water Sampling – 2016 Analytical Results

Table 3-1 (Ballard Site), **Table 3-2** (Enoch Valley Site) and **Table 3-3** (Henry Site) present the exceedances of screening levels in surface water for the 2016 spring and fall events. The comprehensive results for all 2016 surface water constituents are provided in **Appendix B**.

3.2 Groundwater Sampling – 2016 Analytical Results

Table 3-4 (Ballard Site), **Table 3-5** (Enoch Valley Site) and **Table 3-6** (Henry Site) present the exceedances of screening levels by Site in groundwater for the 2016 spring event. The comprehensive results for all 2016 groundwater constituents are provided in **Appendix B**.

3.3 Third Party Data Validation

Third party data validation was performed on all laboratory analyses from the 2016 field program. Data validation is the process of evaluating the quality control (QC) parameters against the criteria established in the QAPP and qualifying those data points where the QC criteria is outside the established criteria. Level III data validation evaluates the following QC parameters:

- QAPP compliance
- Sample preservation and extraction and analytical holding times
- Method, trip, diffusion bag, and equipment rinseate blank sample results
- Reporting limits (RLs)
- Field duplicate sample results
- Tune standard results
- Initial calibration (ICAL), initial calibration verification (ICV), and continuing calibration verification standards (CVS) results

- Surrogate spike recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) sample results
- Laboratory control sample (LCS) and laboratory control duplicate (LCD) results
- Internal standard (IS) results.

In addition to the Level III data validation process, Level IV validation was conducted for 10 percent of the data in accordance with the QAPP. The following data review was conducted as part of the Level IV validation:

- Review of raw data from the instrument (i.e., chromatograms, quantitation reports, spectra)
- Back check of all calculations
- Review of sample preparation and analytical logs

A qualitative assessment also was conducted to evaluate whether the validated data were of sufficient quality to support the project objective (i.e., end use). All of the Level III and IV data validation reports prepared by Laboratory Data Consultants (LDC) showed that the overall assessment of the data was found to be acceptable. The complete validation reports from LDC are included as **Appendix C**.

3.4 Conclusions

This DSR presents data collected in 2016 to address LTM of surface water and groundwater at the Sites. No additional potential data gaps were discovered based on the 2016 data. However, two additional surface water locations were sampled at the Ballard Site to fulfill a data gap along Wooley Valley Creek.

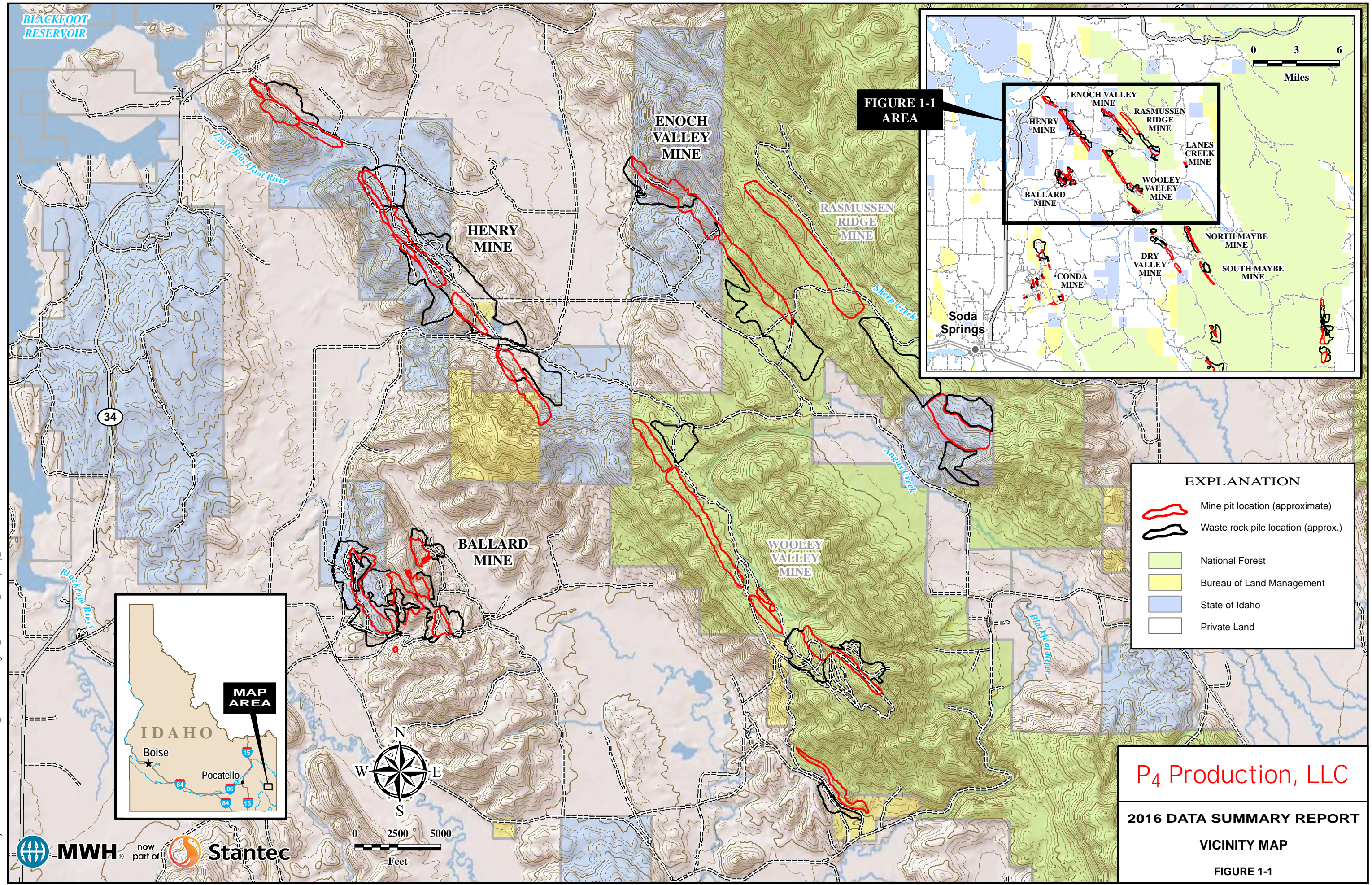
Based on the fall 2016 surface water sample results, it is proposed that the new SEPond sample location be re-named MSP063 and be resampled in spring 2017. The NWPond sample was collected in the pond near background station MST093 (which is at the inlet to the pond), and based on the sample result, this location also represents background conditions. As a result, P4 will not re-name or re-sample this background pond location in 2017. However, these two new 2016 pond locations at the Ballard Site (and their data) will be incorporated into the text and alternative figures in the draft final and final versions of *Ballard Site FS Memorandum #2 – Screening, Detailed, and Comparative Analysis of Assembled Remedial Alternatives* that will be issued in 2017.

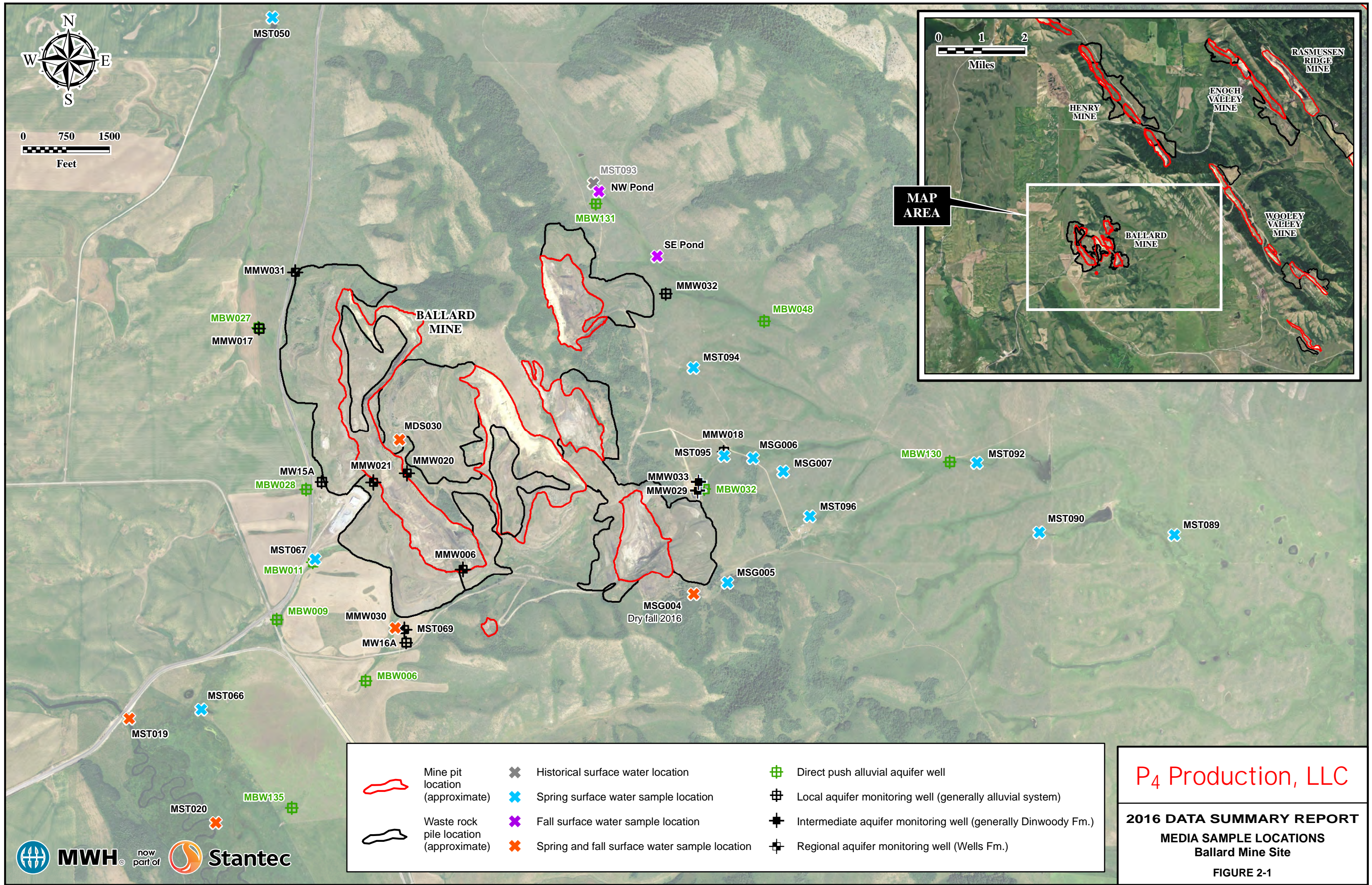
The surface water and groundwater data presented in this DSR will eventually be combined with other Site characterization data to complete the evaluation of conceptual models, source areas, pathways, and receptors in the RI Report prepared for the Enoch Valley Site and during preparation of the upcoming feasibility studies for the Henry and Enoch Valley Sites.

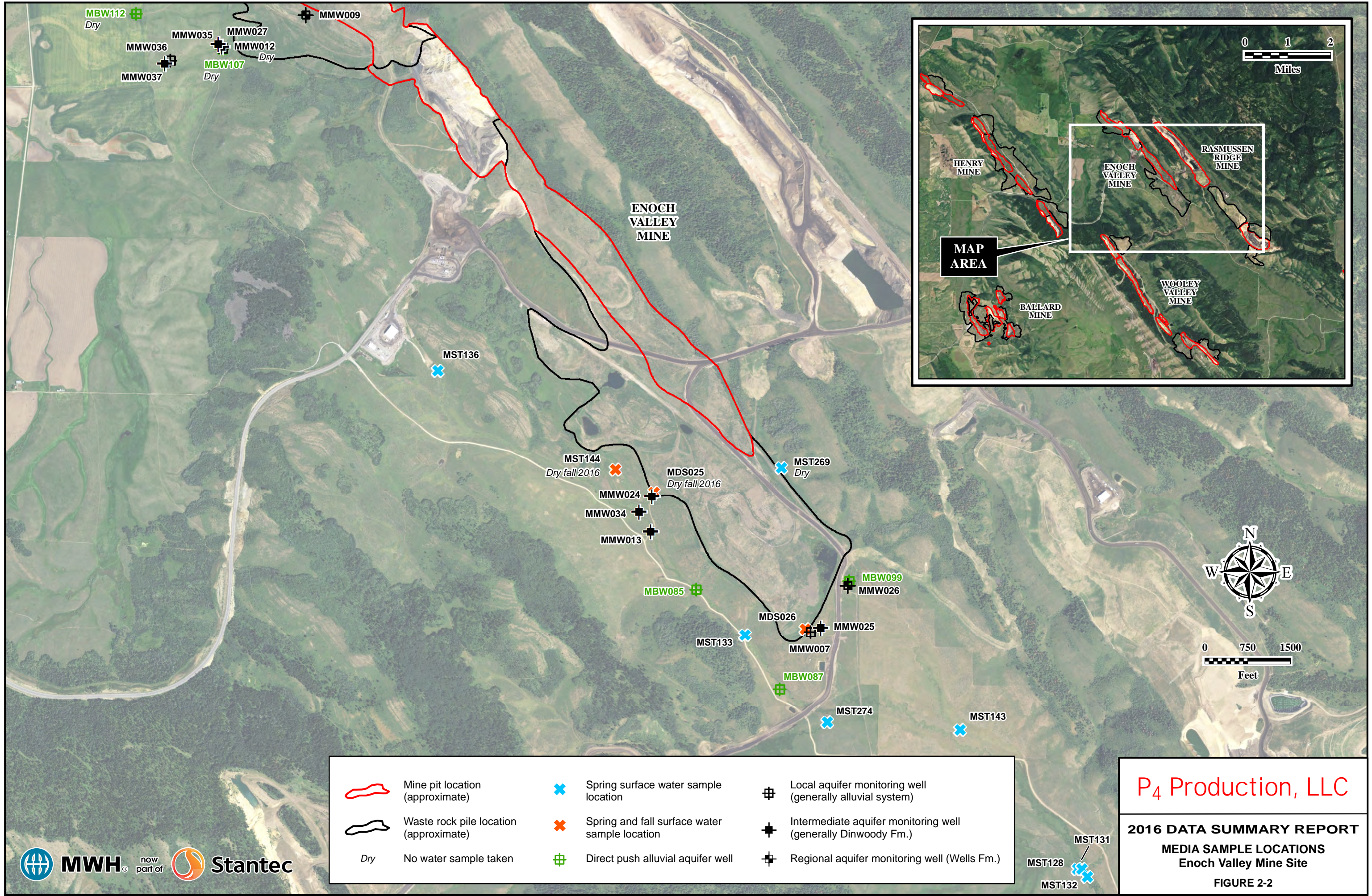
4.0 REFERENCES

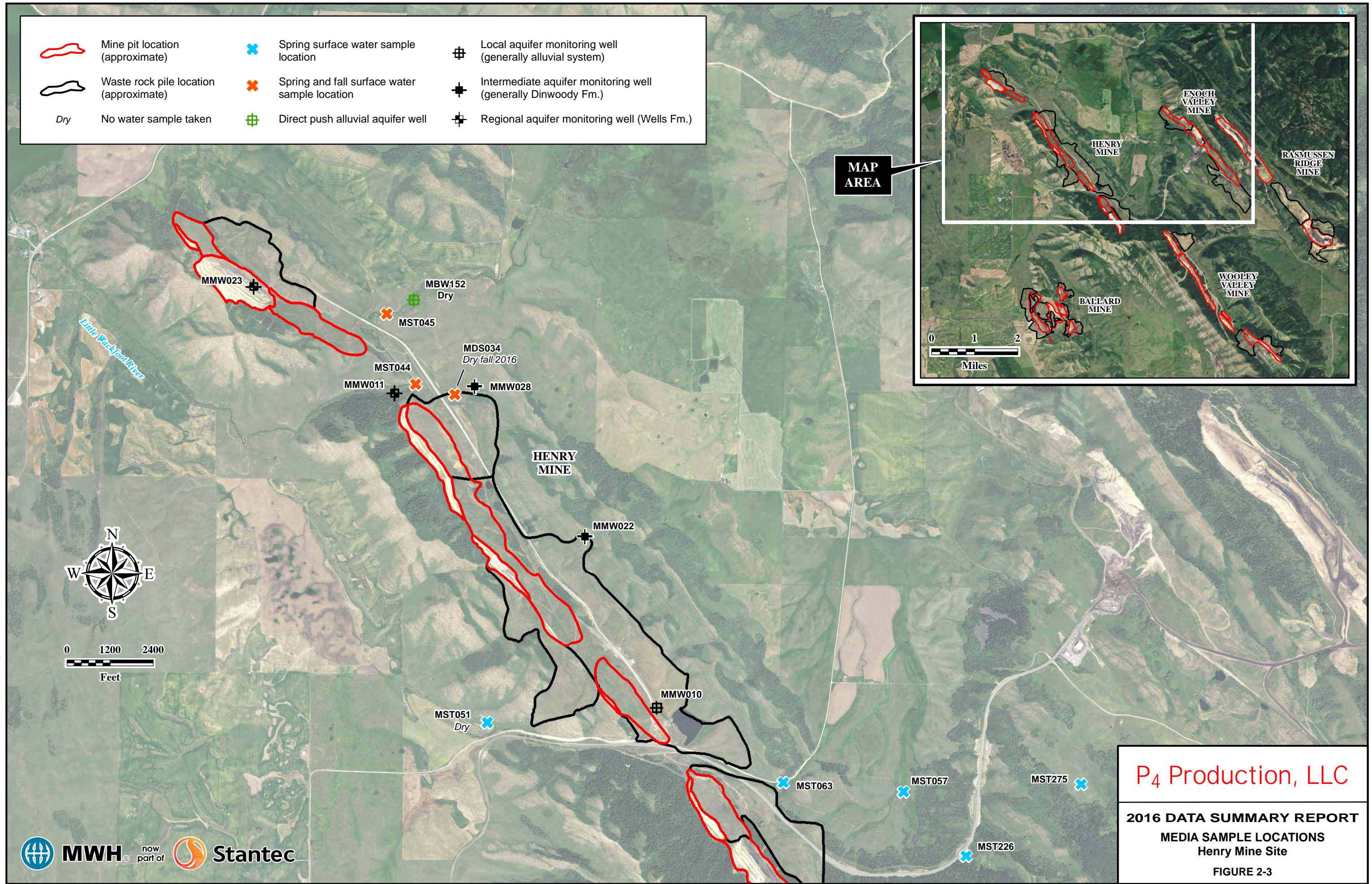
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- MWH, 2012. *2012 Surface and Groundwater Monitoring Programs – Final Rev 2*, prepared for P4 Production L.L.C., May 2012.
- MWH, 2014a. *Proposed P4 Long-Term Surface Water and Groundwater Monitoring Plan – Final Rev 1*, prepared for P4 Production L.L.C., April 2014.
- MWH, 2014b. *Remedial Investigation Report for P4’s Ballard Mine – Final Revision 2*, prepared for P4 Production L.L.C., November 2014.
- MWH, 2015a. *Sampling and Analysis Plan for Long-Term Surface Water and Groundwater Ballard, Henry, and Enoch Valley Mines – Final Revision 1*, prepared for P4 Production L.L.C., April 2015.
- MWH, 2015b. *Ballard Mine Feasibility Study Report Memorandum 1 – Site Background and Screening of Technologies - Draft Revision 0*, prepared for P4 Production L.L.C., March 2015.
- MWH, 2016. *Remedial Investigation Report for P4’s Henry Mine – Draft Revision 1*, prepared for P4 Production L.L.C., August 2016.
- USEPA, 2009. *Administrative Settlement Agreement and Order on Consent/Consent Order for Performance of Remedial Investigation and Feasibility Study at the Enoch, Henry, and Ballard Mine Sites in Southeastern Idaho*. United States Environmental Protection Agency, U.S. EPA Region 10, Idaho Department of Environmental Quality, United States Department of Agriculture, Forest Service Region 4, United States Department of the Interior, Bureau of Land Management, Shoshone-Bannock Tribes, in the Matter of Enoch Valley Mine, Henry Mine, Ballard Mine, P4 Production, L.L.C., Respondent. Effective Date of November 30, 2009.

FIGURES









TABLES

TABLE 3-1

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE

P4 RI/FS

(Page 1 of 7)

Location Identification		MDS030		MDS030 Dup		MDS030 Avg		MDS030	
Location Type		Seep		Seep		Seep		Seep	
Date Collected		5/10/2016		5/10/2016		5/10/2016		9/27/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Cadmium	0.0006 mg/L	<0.00008	--	<0.00008	--	<0.00008	--	<.00008	--
Selenium	0.0031 mg/L	0.772 D	0.756 D	0.78 D	0.772 D	0.776 D	0.764 D	1.02 D	1.01 DJ

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

TABLE 3-1

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS
 (Page 2 of 7)

Location Identification		MSG004		MSG005		MSG006		MSG007	
Location Type		Spring		Spring		Spring		Spring	
Date Collected		5/10/2016		5/10/2016		5/11/2016		5/11/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Cadmium	0.0006 mg/L	0.00004 FJ	--	<0.00008	--	0.00002 FJ	--	<0.00008	--
Selenium	0.0031 mg/L	0.0209	0.0217	0.0052	0.0057	0.279	0.286	0.0139	0.0495

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

TABLE 3-1

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS
 (Page 3 of 7)

Location Identification		MST019		MST019		MST019 Dup		MST019 Avg	
Location Type		Stream		Stream		Stream		Stream	
Date Collected		5/9/2016		9/27/2016		9/27/2016		9/27/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Cadmium	0.0006 mg/L	0.000048 FJ	--	<.00008	--	<.00008	--	<.00008	--
Selenium	0.0031 mg/L	0.0057	0.0068	0.0018	0.0018 J	0.0017	0.0019 J	0.00175	.00185 J

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

TABLE 3-1

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS
(Page 4 of 7)

Location Identification		MST020		MST020		MST050		MST066	
Location Type		Stream		Stream		Stream		Stream	
Date Collected		5/11/2016		9/27/2016		5/9/2016		5/11/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Cadmium	0.0006 mg/L	0.000014 FJ	--	<.00008	--	0.000052 FJ	--	0.000015 FJ	--
Selenium	0.0031 mg/L	0.0053	0.0057	0.0016	0.0017 J	0.00055	0.00075	0.0332	0.0339

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

TABLE 3-1

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS
 (Page 5 of 7)

Location Identification		MST067		MST069		MST069		MST089	
Location Type		Stream		Stream		Stream		Stream	
Date Collected		5/11/2016		5/11/2016		9/27/2016		5/10/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.0006 mg/L	0.0011	--	0.0017	--	0.00099	--	0.000028 FJ	--
Selenium	0.0031 mg/L	0.461 D	0.447 D	1.49 D	1.59 D	1.35 D	1.32 DJ	0.0053	0.0056

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

TABLE 3-1

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE
P4 RI/FS
 (Page 6 of 7)

Location Identification		MST090		MST092		MST094		MST095	
Location Type		Stream		Stream		Stream		Stream	
Date Collected		5/10/2016		5/10/2016		5/10/2016		5/11/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Cadmium	0.0006 mg/L	<0.00008	--	0.000045 FJ	--	0.000018 FJ	--	0.0003	--
Selenium	0.0031 mg/L	<0.0005	0.00026 FJ	0.013	0.0136	0.0008	0.00082	0.0864	0.0859

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

TABLE 3-1

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - BALLARD MINE

P4 RI/FS

(Page 7 of 7)

Location Identification		MST096		NWPOND		SEPOND	
Location Type		Stream		Pond		Pond	
Date Collected		5/10/2016		9/27/2016		9/27/2016	
Analyte (Units)							
Screening Levels							
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.0006 mg/L	<0.00008	--	<.00008	--	0.00011	--
Selenium	0.0031 mg/L	0.0609	0.0668	0.00057	0.0011 J	0.0068	0.0111 J

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

TABLE 3-2

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - ENOCH VALLEY MINE

P4 RI/FS
(Page 1 of 4)

Location Identification		MDS025		MDS025		MDS026		MST128	
Location Type		Seep		Seep		Seep		Stream	
Date Collected		5/13/2016		9/27/2016		5/13/2016		5/13/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.0006 mg/L	0.00076	--	0.0011	--	0.001	--	<0.00008	--
Selenium	0.0031 mg/L	0.174	0.177	0.0198	0.088 J	0.019	0.0786	0.00093	0.00091

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-2

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - ENOCH VALLEY MINE
P4 RI/FS
(Page 2 of 4)

Location Identification		MST131		MST132		MST132 Dup		MST132 Avg	
Location Type		Stream		Stream		Stream		Stream	
Date Collected		5/13/2016		5/13/2016		5/13/2016		5/13/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.0006 mg/L	0.000019 UBF	--	0.00003 UBF	--	<0.00008	--	0.00003 UB	--
Selenium	0.0031 mg/L	0.0038	0.0038	0.0016	0.0017	0.0017	0.0016	0.00165	0.00165

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-2

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - ENOCH VALLEY MINE

P4 RI/FS
(Page 3 of 4)

Location Identification		MST133		MST136		MST143		MST144	
Location Type		Stream		Stream		Stream		Stream	
Date Collected		5/13/2016		5/12/2016		5/13/2016		5/13/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.0006 mg/L	0.000025 UBF	--	0.000061 UBF	--	0.000087 J+	--	0.000065 UBF	--
Selenium	0.0031 mg/L	0.0049	0.0051	0.0012	0.0015	0.0002 FJ	0.00023 FJ	0.365	0.359

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-2

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - ENOCH VALLEY MINE

P4 RI/FS

(Page 4 of 4)

Location Identification		MST274		
Location Type		Stream		
Date Collected		5/13/2016		
Analyte (Units)				
Metals (mg/L)	Screening Levels			
		<u>Dissolved</u>	<u>Total</u>	
	Cadmium	0.0006 mg/L	0.000016 UBF	--
	Selenium	0.0031 mg/L	0.0033	0.0032

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-3

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - HENRY MINE
P4 RI/FS
(Page 1 of 3)

Location Identification		MDS034		MST044		MST044		MST045	
Location Type		Seep		Stream		Stream		Stream	
Date Collected		5/12/2016		5/12/2016		9/27/2016		5/12/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Selenium	0.0031 mg/L	0.0313	0.0338	0.0004 FJ	0.00049 UBF	0.00063	0.00066 J	0.00059 J+	0.00056 J+

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-3

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - HENRY MINE
P4 RI/FS
 (Page 2 of 3)

Location Identification		MST045 Dup		MST045 Avg		MST045		MST057	
Location Type		Stream		Stream		Stream		Stream	
Date Collected		5/12/2016		5/12/2016		9/27/2016		5/11/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Selenium	0.0031 mg/L	0.00054 J+	0.00048 UBF	0.000565 J+	0.00052 UBF	0.00073	0.00069 J	0.00024 FJ	0.00021 FJ

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-3

SUMMARY OF 2016 SURFACE WATER RESULT EXCEEDANCES - HENRY MINE
P4 RI/FS
(Page 3 of 3)

Location Identification		MST063		MST226		MST275	
Location Type		Stream		Stream		Stream	
Date Collected		5/11/2016		5/12/2016		5/12/2016	
Analyte (Units)							
Screening Levels							
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Selenium	0.0031 mg/L	0.0208	0.0282	0.0042	0.004	<0.0005	0.00023 UBF

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-4

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE

P4 RI/FS

(Page 1 of 8)

Location Identification		MBW006		MBW009		MBW011	
Location Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/15/2016		5/15/2016		5/15/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.000027 UBF	--	0.00011 J+	--	0.00013 J+
Manganese	0.05 mg/L	--	0.0075	--	0.137	--	0.008
Selenium	0.05 mg/L	0.405	0.363	0.0027	0.0029	0.452 D	0.662 D
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	391 DJ-	--	349 DJ-	--	307 DJ-	--
Total dissolved solids	500 mg/L	--	796	--	717	--	751

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-4

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE

P4 RI/FS

(Page 2 of 8)

Location Identification		MBW027		MBW028		MBW032	
Location Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/15/2016		5/15/2016		5/11/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.00024	--	0.00026	--	0.00083
Manganese	0.05 mg/L	--	0.00064	--	0.0405	--	0.0009
Selenium	0.05 mg/L	0.257	0.239	0.72 D	0.761 D	1.55 D	1.56 D
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	188 DJ-	--	459 DJ-	--	1160 DJ-	--
Total dissolved solids	500 mg/L	--	564	--	976	--	1900

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-4

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE

P4 RI/FS

(Page 3 of 8)

Location Identification		MBW032 Dup		MBW032 Avg		MBW048	
Location Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/11/2016		5/11/2016		5/14/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.0008	--	0.000815	--	0.00014
Manganese	0.05 mg/L	--	0.0014	--	0.00115	--	0.346
Selenium	0.05 mg/L	1.57 D	1.58 D	1.56 D	1.57 D	<0.0005	<0.0005
				--	--		
Chemistry Parameters (mg/L)				--	--		
Sulfate (as SO ₄)	250 mg/L	1030 DJ-	--	1095 DJ-	--	5.4 J-	--
Total dissolved solids	500 mg/L	--	1890	--	1895	--	130

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-4

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE

P4 RI/FS
(Page 4 of 8)

Location Identification		MBW130		MBW131		MBW135	
Location Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/15/2016		5/14/2016		5/14/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.00046	--	0.00014	--	0.000028 UBF
Manganese	0.05 mg/L	--	0.127	--	0.0014	--	0.141
Selenium	0.05 mg/L	0.00026 FJ	0.00039 FJ	0.0016	0.002	<0.0005	<0.0005
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	10.7 J-	--	2.9 J-	--	51.0 J-	--
Total dissolved solids	500 mg/L	--	145	--	111	--	267

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-4

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE

P4 RI/FS
(Page 5 of 8)

Location Identification		MMW006		MMW017		MMW018	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/10/2016		5/11/2016		5/11/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	<0.00008	--	0.00045	--	<0.00008
Manganese	0.05 mg/L	--	0.00015 FJ	--	0.0028	--	0.023
Selenium	0.05 mg/L	0.151	0.157	0.156	0.155	0.0297	0.0302
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	90.4 J-	--	520 DJ-	--	46.4 J-	--
Total dissolved solids	500 mg/L	--	332	--	1090	--	264

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-4

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE

P4 RI/FS

(Page 6 of 8)

Location Identification		MMW020		MMW021		MMW029	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/15/2016		5/10/2016		5/11/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.0069	--	0.000061 UBF	--	<0.00008
Manganese	0.05 mg/L	--	0.0478	--	<0.0005	--	0.00058
Selenium	0.05 mg/L	0.0664	0.0653	0.0544	0.0556	0.634 D	0.626 D
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	203 DJ-	--	48.7 J-	--	642 DJ-	--
Total dissolved solids	500 mg/L	--	626	--	358	--	1280

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-4

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE

P4 RI/FS
(Page 7 of 8)

Location Identification		MMW030		MMW031		MMW032	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/15/2016		5/13/2016		5/15/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	<0.00008	--	<0.00008	--	0.00017
Manganese	0.05 mg/L	--	0.0211	--	0.00015 FJ	--	0.0016
Selenium	0.05 mg/L	<0.0005	<0.0005	0.00088	0.00093	0.002	0.002
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	15.0 J-	--	2.9 J-	--	5.6 J-	--
Total dissolved solids	500 mg/L	--	229	--	167	--	224

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-4

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - BALLARD MINE

P4 RI/FS
(Page 8 of 8)

Location Identification		MMW033		MW15A		MW16A	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/11/2016		5/15/2016		5/10/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.000013 UBF	--	0.00022	--	<0.00008
Manganese	0.05 mg/L	--	0.0443	--	0.00018 FJ	--	1.81 D
Selenium	0.05 mg/L	0.00018 FJ	0.00014 FJ	1.04 D	1.09 D	0.0088	0.0082
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	28.2 J-	--	619 D	--	783 DJ-	--
Total dissolved solids	500 mg/L	--	267	--	1340	--	1370

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-5

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - ENOCH MINE
P4 RI/FS
 (Page 1 of 6)

Location Identification		MBW085		MBW087		MBW099	
Sample Type		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/14/2016		5/14/2016		5/14/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Manganese	0.05 mg/L	--	0.0043	--	0.0459	--	0.004
Selenium	0.05 mg/L	0.0011	0.0011	0.00022 FJ	0.00024 FJ	0.00038 FJ	0.00015 FJ
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	22.3 J-	--	23.8 J-	--	39.1 J-	--
Total dissolved solids	500 mg/L	--	215	--	331	--	215

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-5

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - ENOCH MINE

P4 RI/FS

(Page 2 of 6)

Location Identification		MMW007		MMW009		MMW013	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/13/2016		5/13/2016		5/14/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Manganese	0.05 mg/L	--	0.059	--	0.0668	--	0.0177
Selenium	0.05 mg/L	0.0017	0.0015	<0.0005	<0.0005	0.178	0.17
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	14.8 J-	--	60.7 J-	--	159 DJ-	--
Total dissolved solids	500 mg/L	--	158	--	393	--	467

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-5

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - ENOCH MINE

P4 RI/FS

(Page 3 of 6)

Location Identification		MMW024		MMW025		MMW026	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/14/2016		5/14/2016		5/10/2016	
Analyte (Units)							
Screening Levels							
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Manganese	0.05 mg/L	--	0.00016 FJ	--	0.0024	--	0.00053
Selenium	0.05 mg/L	0.0613	0.0574	0.00059	0.00053	0.0013	0.0013
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	340 DJ-	--	11.0 J-	--	25.2 J-	--
Total dissolved solids	500 mg/L	--	781	--	171	--	243

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-5

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - ENOCH MINE

P4 RI/FS

(Page 4 of 6)

Location Identification		MMW027		MMW034		MMW034 Dup	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/13/2016		5/14/2016		5/14/2016	
Analyte (Units)							
Screening Levels							
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Manganese	0.05 mg/L	--	0.00089	--	0.00033 FJ	--	0.0002 FJ
Selenium	0.05 mg/L	0.689 D	0.759 D	0.0857	0.0888	0.0886	0.0838
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	334 DJ-	--	132 DJ-	--	133 DJ-	--
Total dissolved solids	500 mg/L	--	840	--	390	--	370

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-5

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - ENOCH MINE

P4 RI/FS

(Page 5 of 6)

Location Identification		MMW034 Avg		MMW035		MMW036	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/14/2016		5/13/2016		5/13/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Manganese	0.05 mg/L	--	0.000265 FJ	--	0.0016	--	0.0018
Selenium	0.05 mg/L	0.08715	0.0863	1.16 D	1.15 D	0.0194	0.0199
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	132.5 DJ-	--	498 DJ-	--	22.9 J-	--
Total dissolved solids	500 mg/L	--	380	--	1160	--	246

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-5

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - ENOCH MINE
P4 RI/FS
 (Page 6 of 6)

Location Identification		MMW037		MMW037 Dup		MMW037 Avg	
Sample Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/13/2016		5/13/2016		5/13/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Manganese	0.05 mg/L	--	0.0021	--	0.0023	--	0.0022
Selenium	0.05 mg/L	0.0306	0.0282	0.0304	0.0288	0.0305	0.0285
						--	--
Chemistry Parameters (mg/L)						--	--
Sulfate (as SO ₄)	250 mg/L	31.0 J-	--	31.0 J-	--	31 J-	--
Total dissolved solids	500 mg/L	--	260	--	254	--	257

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-6

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - HENRY MINE

P4 RI/FS

(Page 1 of 3)

Location Identification		MMW010		MMW011		MMW022	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/12/2016		5/12/2016		5/12/2016	
Analyte (Units)							
Screening Levels							
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.0058	--	0.0007	--	0.00058
Manganese	0.05 mg/L	--	0.0123	--	0.00027 UBF	--	0.193
Selenium	0.05 mg/L	0.127	0.118	0.0005 UBF	0.00041 UBF	0.0478	0.0446
Chemistry Parameters (mg/L)							
Sulfate (as SO4)	250 mg/L	735 DJ-	--	136 DJ-	--	273 DJ-	--
Total dissolved solids	500 mg/L	--	1520 J-	--	532 J-	--	683 J-

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-6

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - HENRY MINE
P4 RI/FS
 (Page 2 of 3)

Location Identification		MMW023		MMW028		MMW028 Dup	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/12/2016		5/12/2016		5/12/2016	
Analyte (Units)							
	Screening Levels						
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.000043 FJ	--	0.000013 FJ	--	0.000023 UBF
Manganese	0.05 mg/L	--	0.308	--	<0.0005	--	<0.0005
Selenium	0.05 mg/L	0.00018 UBF	<0.0005	0.005	0.0036	0.0046	0.0037
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	250 mg/L	221 DJ-	--	68.7 J-	--	68.5 J-	--
Total dissolved solids	500 mg/L	--	670 J-	--	349 J-	--	349 J-

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE 3-6

SUMMARY OF 2016 GROUNDWATER RESULT EXCEEDANCES - HENRY MINE
P4 RI/FS
(Page 3 of 3)

Analyte (Units)	Location Identification	MMW028 Avg	
	Location Type Date Collected	Monitoring Well 5/12/2016	
	<u>Screening Levels</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)			
Cadmium	0.005 mg/L	--	0.000018 UBF
Manganese	0.05 mg/L	--	<0.0005
Selenium	0.05 mg/L	0.0048	0.00365
		--	--
Chemistry Parameters (mg/L)		--	--
Sulfate (as SO ₄)	250 mg/L	68.6 J-	--
Total dissolved solids	500 mg/L	--	349 J-

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Shaded Shade indicates result exceeded Screening Level.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

APPENDICES

APPENDIX A – FIELD NOTES AND FIELD FORMS

A-1 2016 Spring Groundwater and Surface Water Sampling

A-2 2016 Fall Surface Water Sampling

A-1 2016 Spring Groundwater and Surface Water Sampling

TABLE A-1
2016 SPRING SURFACE WATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

(Page 1 of 2)

Matrix	Station ID	Water Temp (deg. C)	Spec Cond (uS/cm) @ 25 deg. C	Cond (uS/cm)	D.O. (% sat.)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Air Temp (deg. c)	Discharge (cfs)	Comments	Date	Time
SW	MDS025	11	1333	977	53.3	5.74	7.06	28.2	12.4	10	N/A	Flow coming from several locations along seep on the hill side. Can not measure.	5/13/2016	1455
SW	MDS026	9.9	1869	1331	48.1	5.3	7.01	56.2	17.7	10	N/A	Flow coming from several locations along seep, approximately 30 feet wide. Can not measure.	5/13/206	1550
SW	MDS030	8.1	944	640	64.5	7.31	7.47	92.6	0.29	1.7	0.01	Seep coming out of hill side beneath tree. Surrounded by waste rock	5/10/2016	930
SW	MDS034	17.5	1040	891	36.7	3.46	7.54	23	0.55	11.7	0.00	Dump seep coming out of hill side (waste pile) pooling in meadow	5/12/2016	1245
SW	MSG004	8.8	648.6	447.3	105.5	11.92	8.12	17.6	3.92	1.7	N/A	8 foot wide seep, unable to collect flow. Daylighting in multiple locations across the hill.	5/10/2016	1510
SW	MSG005	7.1	675.5	444.5	72	8.45	7.95	18.6	0.19	1.7	0.04	water coming out of piped spring into cattle trough water collected directly from pipe	5/10/2016	1545
SW	MSG006	7.2	1708	1125	65.9	7.91	7.5	12.8	0.9	6.1	N/A	Flow can not be measured. Daylights on hill side and flow through grassy area intermittently. Approx. 30ft wide seep across hill side.	5/11/2016	1020
SW	MSG007	6.3	634.3	408.2	27.8	3.4	8	5.6	0.7	6.1	N/A	Spring flow can not be measured. Daylights at toe of hill in an area approximately 20ft wide. Hummocky.	5/11/2016	1000
SW	MST019	12.5	329.7	251.3	94	8	7.48	107.7	13.5	11.7	418.00	Flow from USGS station online, staff gauge submerged.	5/9/2016	1505
SW	MST020	11	374.7	274.6	87.8	9.71	8.34	54.9	12.8	15	392.00	No flow collected, river running too high to enter safely.	5/11/2016	1330
SW	MST044	13.5	699	545	95.7	9.98	8.17	38.6	1.33	11.7	12.75		5/12/2016	1205
SW	MST045	11.6	693	515	89	9.62	8.02	38.7	1.08	11.7	10.37		5/12/2016	1100
SW	MST050	16.1	280.9	233	103.2	8.1	7.99	131.9	3.02	9.4	0.22	stream flow north of catchment pond	5/9/2016	1750
SW	MST051	DRY											5/12/2016	1355
SW	MST057	16.7	412.8	347.2	73	7.1	8.04	11.5	0.98	10.6	N/A	Flow too low to measure in marshy area.	5/11/2016	1715
SW	MST063	12.6	649.5	495.5	3.8	0.43	7.6	-19.7	14.2	10.6	N/A	No channelized flow, large marshy area.	5/11/2016	1620
SW	MST066	18.1	581	504	111.3	10.54	8.33	27.5	1.87	6.1	0.06	stream flowing through grassy ravine with tussocks	5/11/2016	1420
SW	MST067	8.3	2354	1602	60.8	7.5	8.1	42	7.22	6.1	0.02	small stream cutting through grassy field	5/11/2016	1530
SW	MST069	10.4	1563	1129	72.3	8.03	7.51	44.7	0.36	6.1	0.02	stream with shallow rock bottom coming out of the toe of waste rock pile	5/11/2016	1215
SW	MST089	8.9	456.6	316.3	88.3	10.21	7.88	17.2	1.19	1.7	0.03	meandering stream cutting through grassy meadows	5/10/2016	1218

TABLE A-1
2016 SPRING SURFACE WATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

(Page 2 of 2)

Matrix	Station ID	Water Temp (deg. C)	Spec Cond (uS/cm) @ 25 deg. C	Cond (uS/cm)	D.O. (% sat.)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Air Temp (deg. c)	Discharge (cfs)	Comments	Date	Time
SW	MST090	9.4	394	276.9	84.6	9.52	7.91	16.3	0.55	1.7	1.13	meandering stream through grassy field; grass in stream	5/10/2016	1345
SW	MST092	7.3	564.1	373.4	59.8	7.15	7.62	-74	1.38	1.7	0.19	meandering stream through grassy field; grass in stream; lots of cow manure	5/10/2016	1100
SW	MST094	11	330	241.6	74.3	8.05	7.84	20	0.65	1.7	0.04	stream flowing through culvert sample taken above culvert	5/10/2016	1627
SW	MST095	11.8	945	707	77	8.15	7.88	17.7	0.39	1.7	0.13	small stream with thick grass and lots of cow manure.	5/11/2016	1120
SW	MST096	13.2	664	514	108.7	11.29	8.38	10.8	2.28	1.7	0.04		5/10/2016	1600
SW	MST128	9.7	446	315.6	81.8	9.15	8	41.3	4.5	10	8.41		5/10/2016	1020
SW	MST131	7.5	399.3	266	80.4	9.55	7.99	46.7	10.1	10	1.53		5/13/2016	945
SW	MST132	7.8	309	205.8	79.5	9.33	7.85	55	5.91	10	6.18		5/13/2016	915
SW	MST133	18.6	299.9	263.3	84.5	7.77	7.88	26.5	16.2	10	1.65		5/13/2016	1325
SW	MST136	18.3	391.6	343.3	42.7	3.9	7.49	29.4	6.59	16.1	N/A	No flow swampy area	5/12/2016	1445
SW	MST143	11.3	139.6	103	76	8.31	7.6	41.8	18.4	10	0.005		5/13/2016	1135
SW	MST144	11.1	791	581	57	6.18	7.58	42.7	13.4	10	0.02		5/13/2016	1425
SW	MST226	7.4	353.4	235.2	80.6	9.44	7.26	58.4	2.64	17.2	0.10		5/12/2016	1650
SW	MST269	DRY											5/13/2016	1530
SW	MST274	12.3	554.3	419.6	86.4	9.14	7.91	29.1	7.48	10	0.49		5/13/2016	1215
SW	MST275	21.6	109.9	102.9	78	6.77	7.55	43.6	45.5	13.9	0.02		5/12/2016	1555

cfs	cubic feet per second	NTU	Nephelometric Turbidity Units
deg. C	degrees Celsius	N/A	Parameter not required / not collected
g/L	grams per liter	SW	Surface Water
mg/l	milligrams per liter	uS/cm	microSiemens per centimeter
mV	millivolts	% sat.	percent saturation

TABLE A-2
2016 SPRING GROUNDWATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

(Page 1 of 2)

Matrix	Station ID	Elevation MP (ft-AMSL)	Static Water Level (ft BMP)	Elevation Static Water (ft-AMSL)	Purge Rate (L/min)	Cumulative Purge Vol. (L)	Water Temp (deg. C)	pH	ORP (mV)	D.O. (mg/L)	Spec Cond (uS/cm) @ 25 deg. C	Turbidity (NTU)	Sampling Device	Comments	Date	Time
GW	MBW006	6319.31	2.33	6311.46	0.25	5.25	6.68	7.17	7.17	163.9	1081	0.3	Peristaltic	low flow	5/15/2016	1430
GW	MBW009	6310.69	3.7	6306.72	0.12	3.60	7.5	6.75	6.75	60.4	1043	0.55	Peristaltic	low flow	5/15/2015	1340
GW	MBW011	6339.8	3	6336.78	0.90	4.40	5.7	6.95	6.95	82.1	784.6	4.17	Peristaltic	purge and sample	5/15/2016	1230
GW	MBW027	6313.33	6.3	6301.96	0.20	2.70	5.9	7.26	7.26	73.5	903	1.36	Peristaltic	low flow	5/15/2016	1025
GW	MBW028	6339.99	3.9	6331.64	N/A	N/A	6.6	6.76	6.76	78.2	1334	11.5	Peristaltic	purge and sample	5/15/2016	1130
GW	MBW032	6499.13	7.37	6487.28	0.25	4.25	4.72	7.12	7.12	135.5	2087	0	Peristaltic	low flow	5/11/2016	1500
GW	MBW048	6421.72	1.1	6421.02	0.09	7.80	5.8	6.59	6.59	4.8	194.7	2.96	Peristaltic	low flow	5/14/2016	1613
GW	MBW085	6639.57	8.5	6637.7	0.50	19.50	5	6.86	6.86	64.7	369.1	3.16	Peristaltic	purge and sample	5/14/2016	1307
GW	MBW087	6587.3	1.6	6586.11	0.13	8.55	5.9	6.75	6.75	56.3	584.5	9	Peristaltic	low flow	5/14/2016	1145
GW	MBW099	6599.25	7.2	6598.2	0.50	3.75	9.39	7.02	7.02	166.5	308	2.3	Peristaltic	purge and sample	5/14/2016	1311
GW	MBW107	6486.78	SEE FIELD NOTES												5/13/2016	930
GW	MBW112	6404	DRY												5/13/2016	1147
GW	MBW130	6416.29	3.5	6413.26	0.40	10.15	6	7.77	7.77	63.1	212.9	63.7	Peristaltic	purge dry and sample	5/15/2016	850
GW	MBW131	6468.52	1.5	6465.14	0.07	5.90	6.2	6.5	6.5	71.8	166.5	4.25	Peristaltic	low flow	5/14/2016	1755
GW	MBW135	6290.56	1.6	6287.4	N/A	N/A	6.7	7.04	7.04	63	449.3	4.11	Peristaltic	purge dry and sample	5/14/2016	1840
GW	MBW152	6280	DRY												5/14/2016	945
GW	MW15A	6364.37	19.6	6341.26	N/A	8.00	7.99	6.71	6.71	172.8	1677	0.6	Peristaltic	low flow	5/15/2016	1240
GW	MW16A	6346.71	6.88	6336.76	0.30	14.50	6.73	7.33	7.33	-78.2	1655	0	Peristaltic	low flow	5/10/2016	1650
GW	MMW006	6485.46	265.61	6218.51	0.35	25.00	9.24	7.53	7.53	125.4	523	0	Bladder Pump/Nitrogen	low flow	5/10/2016	1527
GW	MMW007	6619.89	72	6584.05	0.1	87	10.19	7.06	7.06	152.2	237	0	Bladder Pump	low flow	5/14/2016	1105
GW	MMW009	6789.2	211.15	6574.2	0.40	35.25	9.35	7.1	7.1	-1.5	639	0	Bladder Pump/Nitrogen	low flow	5/13/2016	1110
GW	MMW010	6462.62	1.61	6457.02	1.00	25.00	7.04	6.45	6.45	175.9	1793	0	Bladder Pump	low flow	5/12/2016	1633
GW	MMW011	6268.31	73.75	6194.11	0.25	8.75	10.31	7.28	7.28	94.4	833	0	Bladder Pump	low flow	5/12/2016	1155
GW	MMW012	6488.72	DRY												5/13/2016	900
GW	MMW013	6634.46	3.3	6630.21	0.80	14.75	7.37	6.91	6.91	169.2	680	0	Bladder Pump/Nitrogen	low flow	5/14/2016	1453
GW	MMW017	6313.86	38.77	6274	0.04	4.40	10.63	6.82	6.82	171.2	1379	0	Bladder Pump	low flow	5/11/2016	1755
GW	MMW018	6459.52	8.65	6447.16	0.10	5.00	7.64	7.29	7.29	160.4	419	0	Bladder Pump	low flow	5/11/2016	1123
GW	MMW020	6525.71	274.25	6245.26	N/A	49.50	8.77	6.96	6.96	164.7	899	0.8	Bladder Pump/Nitrogen	low flow	5/15/2016	1120

TABLE A-2 2016 SPRING GROUNDWATER FIELD PARAMETERS P4 MONSANTO, IDAHO																
(Page 2 of 2)																
Matrix	Station ID	Elevation MP (ft-AMSL)	Static Water Level (ft BMP)	Elevation Static Water (ft-AMSL)	Purge Rate (L/min)	Cumulative Purge Vol. (L)	Water Temp (deg. C)	pH	ORP (mV)	D.O. (mg/L)	Spec Cond (uS/cm) @ 25 deg. C	Turbidity (NTU)	Sampling Device	Comments	Date	Time
GW	MMW021	6436.3	210.12	6224.52	0.34	20.00	9.52	7.19	7.19	133.3	625	0	Bladder Pump	low flow	5/10/2016	1342
GW	MMW022	6635.85	202.11	6425.65	0.25	21.50	9.45	7.1	7.1	149.7	925	1.3	Bladder Pump	low flow	5/12/2016	1535
GW	MMW023	6230.92	106.62	6122.66	0.88	28.50	9.16	6.99	6.99	-113.3	983	0	Bladder Pump	low flow	5/12/2016	1025
GW	MMW024	6704.05	54.29	6642.67	0.75	14.00	8.07	7.07	7.07	152.1	1026	0	Bladder Pump/Nitrogen	low flow	5/14/2016	1417
GW	MMW025	6612.87	40.1	6583.77	0.20	5.50	7.95	7.95	7.95	128.3	289	0	Bladder Pump	purge and sample	5/14/2016	1225
GW	MMW026	6599.21	284.7	6312.49	0.65	35.25	9.78	7.46	7.46	48.6	427	0	Bladder Pump/Nitrogen	low flow	5/10/2016	1127
GW	MMW027	6491.07	91.75	6382.43	0.55	12.25	8.34	7.07	7.07	104.9	1115	0	Bladder Pump	low flow	5/13/2016	1235
GW	MMW028	6316.91	63.96	6237.15	0.75	12.25	8.35	7.53	7.53	101.2	565	0	Bladder Pump	low flow	5/12/2016	1255
GW	MMW029	6498.67	13.64	6478.96	0.40	14.75	8.12	6.94	6.94	174.1	1562	0	Bladder Pump	low flow	5/11/2016	1250
GW	MMW030	6355.25	33	6328.67	N/A	10.00	8.72	7.72	7.72	142.5	405	0	Bladder Pump	purge and sample	5/10/2016	1340
GW	MMW031	6346.42	97.83	6247.74	0.85	16.00	9.57	7.82	7.82	128	260	0	Bladder Pump	low flow	5/13/2016	1700
GW	MMW032	6446.39	22.8	6424.39	0.75	15.00	6.13	7.36	7.36	190.2	382	0	Bladder Pump	purge and sample	5/15/2016	915
GW	MMW033	6489.84	26.26	6478.2	1.50	105.00	6.66	7.7	7.7	49.2	465	0	Bladder Pump	purge and sample	5/11/2016	1415
GW	MMW034	6640.31	7.31	6627.4	0.35	15.75	8.12	7.36	7.36	164.6	554	0	Bladder Pump/Nitrogen	low flow	5/14/2016	1545
GW	MMW035	6500.34	92.87	6390.2	0.45	13.75	8.29	6.95	6.95	120.3	1456	0	Bladder Pump/Nitrogen	low flow	5/13/2016	1315
GW	MMW036	6425.18	112.66	6309.07	0.40	10.25	9	7.52	7.52	142.2	421	0	Bladder Pump	low flow	5/13/2016	1540
GW	MMW037	6419.39	113.35	6302.39	0.35	21.50	9.6	7.51	7.51	137.8	428	1.8	Bladder Pump/Nitrogen	low flow	5/13/2016	1500

deg. C	degrees Celsius	mg/l	milligrams per liter
ft-AMSL	feet above mean sea level	mV	millivolts
ft-BMP	feet below measuring point	N/A	Parameter not required / not collected
GW	Groundwater	NTU	Nephelometric Turbidity Units
L	liters	uS/cm	microSiemens per centimeter
L/min	liters per minute		

2016 Spring Groundwater Sampling Field Forms

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/15/16 Well ID: MBW006Task: Groundwater Sampling Field Crew: A. Pettley, Tom OsbornMeasuring Point (MP): TOCN Water Level (WL): 2.25 ft below MPSampling Method (see applicable calculations below): Low Flow Device: parastatic

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 1.85 Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$:
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 14.0 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ftThree Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD - WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (μS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow <u>≤ 1</u> 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1400	2.35	-	.5	6.59	7.22	164.5	6.74	1105	Ø
1415	2.35	-	1.5	6.54	7.21	164.5	6.74	1095	Ø
1420	2.35	.25	2.75	6.53	7.17	164.5	6.62	1087	0.4
1425	2.33	.25	4	6.58	7.17	163.9	6.54	1081	0.5

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (μS/cm)	Turbidity (NTU)
1430	2.33	.25	5.25	6.68	7.17	163.9	6.55	1081	0.3

SAMPLE ID: 1605GWMW006-F, U TIME: 1430

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

- Downloaded Transducer
- Well needs a lock

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 05/15/15 Well ID: MBW009Task: Groundwater Sampling Field Crew: Bl EyMeasuring Point (MP): TOC N Water Level (WL): 0.75 ft below MPSampling Method (see applicable calculations below): low flow Device: Peristaltic / tubing

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 0.78L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L

3-Volume Purge Sampling

Total Depth (TD): 10.1 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ftThree Purge Volumes = $3 * [\text{Pi} * r^2 * H * 7.48]$: 10.53L gal Required Run Time: _____ min/ hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1320	3.3	0.12	0.65	7.2	6.88	71.0	1.12	1077	4.17
1325	3.71	0.12	1.40	7.3	6.76	73.4	0.67	1041	0.4
1330	3.71	0.12	2.0	7.4	6.76	54.6	0.61	1004	0.46
1335	3.00	0.12	2.9	7.4	6.76	55.8	0.64	1020	0.59
1340	3.70	0.12	3.6	7.5	6.75	60.4	0.62	1043	0.55

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1340	3.70	0.12	3.6	7.5	6.75	60.4	0.62	1043	0.55

SAMPLE ID: 11056WMBW009-U, F TIME: 1340

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 05/15/16 Well ID: MBW011Task: Groundwater Sampling Field Crew: BS/EYMeasuring Point (MP): T.O.C.N. Water Level (WL): 0.0 ft below MPSampling Method (see applicable calculations below): Purge Dry/Sample Device: peristaltic/tubing

Low Flow Sampling

Minimum Purge = 2* (feet * vol tubing + vol pump): BS Starting PSI = (1/2 WL + 20): BS
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L80% = 3 ft.
below TOC

3-Volume Purge Sampling

Total Depth (TD): 14.83 ft below MP Water Height (H): BS ft below MP Casing Radius (r): BS ftThree Purge Volumes = $3 \cdot [P_i \cdot r^2 \cdot H \cdot 7.48]$: BS gal Required Run Time: BS min/hr
H = TD-WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1154	0.0	4.4L	800mL	6.0	6.97	78.0	3.10	893	0.68
1159	5.5		2L	5.8	6.66	83.0	1.07	813	1.11
1204	9.9		3L	6.1	6.60	82.9	1.13	802	2.65
1206	12.4		4.4L	5.9	6.61	81.7	4.04	814	35.4
1208			Dry						BS
1230	recharged to 80% - Sample								

Continue stabilization readings on additional pages if necessary

Recharge 1 f.t. per 1 min 20 sec.

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1230	3.0	0.9	4.4L	5.7	6.95	82.1	3.03	784.4	4.17

SAMPLE ID: 1605GWMBW011 - (a,f) TIME: 1230Final Low Flow Sampling Settings: PSI: BS Charge: BS sec Exhaust: BS sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 05/15/16 Well ID: MBW027Task: Groundwater Sampling Field Crew: BU EYMeasuring Point (MP): TOCN Water Level (WL): 10.0 ft below MPSampling Method (see applicable calculations below): low flow Device: peristaltic tubing

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 1.2L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [\text{Pi} * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD - WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1005	6.1	0.2	0.2	6.0	7.37	74.0	6.35	893	3.39
1010	6.3	0.2	0.7	6.0	7.33	74.9	5.95	890	2.31
1015	6.3	0.2	1.4	6.0	7.26	75.9	5.61	897	1.96
1020	6.3	0.2	2.0	5.9	7.26	74.5	5.56	898	1.92
1025	6.3	0.2	2.70	5.9	7.26	73.5	5.52	903	1.36

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1025	6.3	0.2	2.70	5.9	7.26	73.5	5.52	903	1.36

SAMPLE ID: 10509188.0102-P4-1-F TIME: 1030

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 05/15/10 Well ID: MBW028Task: Groundwater Sampling Field Crew: BJ EYMeasuring Point (MP): TOCN Water Level (WL): 4.2 ft below MPSampling Method (see applicable calculations below): Purge only / sample Device: peristaltic /

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$:
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L

3-Volume Purge Sampling

Total Depth (TD): 19.74 ft below MP Water Height (H): ft below MP Casing Radius (r): ftThree Purge Volumes = $3 * [\text{Pi} * r^2 * H * 7.48]$: gal Required Run Time: min/ hr
H = TD - WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1045	9.2	—	—	6.4	7.02	68.6	1.6	1216	2.1
1050	10.4	—	—	6.3	6.76	69.8	1.23	1246	1.99
1055	12.7	—	—	6.5	6.64	71.0	0.84	1298	1.68
1113	DRY	—	—	—	—	—	—	—	—
1130	recharged to 3.9' bgs - sample								

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1130	3.9	—	—	6.6	6.76	78.2	0.93	1334	11.5

SAMPLE ID: 10509188.0102-01.F TIME: 1130Final Low Flow Sampling Settings: PSI: Charge: sec Exhaust: sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/11/16 Well ID: M3W032Task: Groundwater Sampling Field Crew: A. Rottley, L. RalpinMeasuring Point (MP): above TOL H Water Level (WL): 7.35' ft below MPSampling Method (see applicable calculations below): low flow Device: Peristaltic

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: above 1.86 Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$:
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(14.41L.03) + .5

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD-WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1441	7.35								
1441 1450	7.35	.25	1.5	4.66	7.14	129.0	6.70	2078	5.8
1455	7.35	.25	3.00	4.84	7.12	133.2	6.59	2079	0
1500	7.37	.25	4.25	4.72	7.12	135.5	6.62	2087	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1500	7.37	0.25	4.25	4.72	7.12	135.5	6.62	2087	0

SAMPLE ID: 1605 GW M3W032-1-V.F ^{DUP} 1605 GW M3W032-2-V.F ^{DUP} TIME: 1500, 1515

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

No Transducer

WELL SAMPLING FORM

Page: 1 of 2Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/14/16 Well ID: M13W048Task: Groundwater Sampling Field Crew: T. Ogburn B. Jones E. YeagerMeasuring Point (MP): TOC Water Level (WL): 0.75 ft below MPSampling Method (see applicable calculations below): Low Flow Device: peristaltic/dedicated tubing

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 0.45L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: TO
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L

3-Volume Purge Sampling

Total Depth (TD): 8.32 ft below MP Water Height (H): TO ft below MP Casing Radius (r): 1.8 ftThree Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: 2.64L gal Required Run Time: TO min/hr
H = TD - WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1505	—	Started pump	—	—	—	—	—	—	TO
1508	1.0	.085L	0.2L	6.5	7.18	22.8	1.32	173.6	9.50
1513	1.05	.085L	1.0L	6.3	6.95	26.4	0.75	173.2	55.4
1518	1.05	.085L	1.45L	6.3	6.80	24.1	0.65	176.3	50.4
1523	1.05	.085L	1.80L	6.3	6.81	23.7	0.62	178.1	48.0
1528	1.05	.085L	2.40L	6.1	6.74	16.7	0.64	183.7	29.9
1533	1.05	.085L	2.70L	6.0	6.72	14.9	0.61	186.3	22.0
1538	1.05	.085L	3.45	5.8	6.64	14.3	0.53	189.0	15.3
1543	1.05	.085L	4.00	5.7	6.54	15.0	0.50	189.9	14.2
1548	1.05	.085L	4.60	5.7	6.58	11.4	0.51	190.8	10.2
1553	1.05	.085L	5.20	5.8	6.60	6.8	0.48	192.0	6.05
1558	1.05	.085L	5.90	5.8	6.62	6.1	0.42	192.9	5.55

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1613	1.10	.085L	7.80	5.8	6.59	4.8	0.42	194.7	2.96

SAMPLE ID: 1605 GWM13W048 - U, F TIME: 1613

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

Page: 2 of 2

Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/14/16 Well ID: MBW048

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (μ S/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow \leq 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	\leq 5
1603	1.05	.085L	6.30	5.8	6.61	5.4	0.45	193.8	4.45
1608	1.10	.085L	7.00	5.8	6.58	6.4	0.42	194.4	2.94
1603	1.10	.085L	7.80	5.8	6.59	4.8	0.42	194.7	2.96

hole volume
3.67 L

WELL SAMPLING FORM

Page: 1 of 1

Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/14/16 Well ID: M3W085

Task: Groundwater Sampling Field Crew: T. Osborn B. Jones E. Meyer

Measuring Point (MP): TOCN Water Level (WL): 1.7 ft below MP (2.00)

Sampling Method (see applicable calculations below): _____ Device: peristaltic/dedicated tubing

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: do Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: 70
Tubing vol = 0.031 L/ft, Bladder pump vol = 0.5 L

3-Volume Purge Sampling

Total Depth (TD): 12.25 ft below MP Water Height (H): 1.7 ft below MP Casing Radius (r): 1.5 ft

Three Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: 11.01 L gal Required Run Time: _____ min/ hr
H = TD - WL, $P_i = 3.1415$, 1 gal = 3.785 L, 4 in casing = 0.653 gal/ft, 6 in casing = 1.469 gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
12:23	1.7	.125		5.5	7.71	49.2	34.0	415.0	4.25 *
12:29	5.5		2 L	5.2	7.38	56.4	6.11	362.8	11.0
12:33	6.8		4 L	5.2	7.18	59.6	6.08	367.5	34.7
12:37	7.5		6 L	4.8	7.02	61.7	6.61	376.5	21.2
12:43	8.1		9 L	4.8	6.95	64.0	6.57	377.0	27.9
12:47	8.4		11 L	4.9	6.92	63.1	6.85	373.0	17.9
12:52			13 L						
12:53	8.45	.5L	13.5 L	4.9	6.92	59.8	6.94	372.7	6.0
12:57	8.45	0.5L	15 L	4.8	6.87	62.7	7.06	372.1	2.38
13:03	8.50	0.325L	17 L	4.8	6.87	63.4	7.09	370.0	2.81
13:07	8.5	0.5L	19.5 L	5.0	6.86	64.7	7.17	369.1	3.16

Continue stabilization readings on additional pages if necessary

slowed down pump rate

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
13:07	8.5	0.5 L	19.5 L	5.0	6.86	64.7	7.17	369.1	3.16

SAMPLE ID: 1605GWM3W085-U, F TIME: 13:07

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

* Started to drop when pumping at lowest possible setting meant to purge clay then held at 8.45' below TOCN purge 3 volumes of water column.

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016Date: 5/14/16Well ID: MBW087Task: Groundwater SamplingField Crew: T. Debow B. Jones E. YeagerMeasuring Point (MP): To CNWater Level (WL): 1.4

ft below MP

(1.7)

Sampling Method (see applicable calculations below): low flowDevice: Peristaltic / Tubing

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 0.53LStarting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____

Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L

3-Volume Purge Sampling

Total Depth (TD): 12.1 ft below MPWater Height (H): 1.4 ft below MPCasing Radius (r): 1.5 ftThree Purge Volumes = $3 * [Pi * r^2 * H * 7.48]$: _____ gal

Required Run Time: _____ min/hr

H = TD - WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1045	1.6	0.15L	0.3L	6.4	7.46	44.5	2.27	581.4	70.2
1050	1.6	0.15	1.05L	6.2	7.08	49.7	1.13	580.6	40.6
1055	1.6	0.15	1.8L	6.0	6.89	51.9	0.86	581.8	23.6
1100	1.6	0.15	2.55L	6.0	6.83	52.7	0.67	583.0	23.9
1105	1.6	0.15	3.3L	6.0	6.81	53.7	0.55	583.7	21.6
1110	1.6	0.15	4.05L	6.0	6.78	54.1	0.48	583.9	15.9
1115	1.6	0.15	4.8L	5.9	6.75	54.8	0.47	584.8	12.4
1120	1.6	0.15	5.55L	5.9	6.76	55.2	0.45	585.0	8.49
1125	1.6	0.125	6.05L	6.0	6.75	55.5	0.44	585.0	8.36
1130	1.6	0.125	6.675L	5.9	6.75	56.0	0.44	584.1	7.07
1135	1.6	0.125	7.3L	6.0	6.75	56.3	0.46	585.3	9.44
1140	1.6	0.125	7.925L	6.0	6.75	56.1	0.41	585.0	9.00

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1145	1.6	0.125	8.55L	5.9	6.75	56.3	0.47	584.5	9.00

SAMPLE ID: 1605MBW087-U, FTIME: 1145

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/9/16 Well ID: MBW099Task: Groundwater Sampling Field Crew: A. Pettley, L. RodriguezMeasuring Point (MP): Top of well casing Water Level (WL): 0.95' ft below MPSampling Method (see applicable calculations below): _____ Device: Perrin-Hall

Low Flow Sampling

Minimum Purge = $2 \times (\text{feet} \times \text{vol tubing} + \text{vol pump})$: _____ Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L

3-Volume Purge Sampling

Total Depth (TD): 17.29 ft below MP Water Height (H): 16.34 ft below MP Casing Radius (r): _____ ftThree Purge Volumes = $3 \times [\text{Pi} \times r^2 \times H \times 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow \leq (L) 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1713	4.98'								
1713	4.98'	.35 L/min		6.91	7.17	144.7	4.65	331	0
1718	8.13'	.35 L/min		6.43	6.83	150.4	4.79	332	0
1723	11.13'	.35 L/min		6.54	6.77	148.4	5.44	337	0
<u>5/14/16</u>	<u>Purging</u>	<u>Perrin-Hall</u>	<u>after</u>	<u>Purging</u>	<u>dry on 5/9/16</u>				
1303	1.91								
1305	4.15	~.35	.75	8.72	7.52	156.2	6.87	364	3.8
1308	5.50	~.5	2.25	7.79	7.38	159.2	8.49	317	1.0
1311	7.20	~.5	3.75	9.39	7.02	166.5	7.66	308	2.3

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1311	7.20	~.5	3.75	9.39	7.02	166.5	7.66	308	2.3

SAMPLE ID: 1605 GW MBW099 - U, F TIME: 1313Final Low Flow Sampling Settings: PSI: NA Charge: NA sec Exhaust: AI secPerrin-Hall

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/13/16 Well ID: MBW107Task: Groundwater Sampling Field Crew: A. Pettley, L. RodnerMeasuring Point (MP): TOC(N) Water Level (WL): 34.50 ft below MPSampling Method (see applicable calculations below): — Device: —

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: — Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: —
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L

3-Volume Purge Sampling

Total Depth (TD): 39.25 ft below MP Water Height (H): — ft below MP Casing Radius (r): — ftThree Purge Volumes = $3 * (\pi * r^2 * H * 7.48)$: — gal Required Run Time: — min/hr
H = TD - WL, $\pi = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow \leq 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	\leq 5
- Could not sample well. WL too deep for peristaltic pump and case diameter too narrow for disposable bailer. Could not collect a sample.									

Continue stabilization readings on additional pages if necessary

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)

SAMPLE ID: — TIME: —Final Low Flow Sampling Settings: PSI: — Charge: — sec Exhaust: — secNo sample collected. AP
5/13/16

Page: 1 of 1

Task: Groundwater Sampling Field Crew: A. Pettley, L. Rodman

Sampling Method (see applicable calculations below): _____ Device: _____

Low Flow Sampling TDO@ 17.59

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: _____ Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
 Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 \cdot [\text{Pi} \cdot r^2 \cdot H \cdot 7.48]$: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

[illegible][illegible]

SAMPLE ID: _____ TIME: _____

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 14:15 Well ID: MBW130Task: Groundwater Sampling Field Crew: TO, BJ, EYMeasuring Point (MP): TOC Water Level (WL): 1.4' ft below MPSampling Method (see applicable calculations below): purge day / sample Device: peristaltic / hand Tub: 4.7

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: to
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]Starting PSI = $(\frac{1}{2} \text{WL} + 20)$: to

3-Volume Purge Sampling

Total Depth (TD): 25.15 ft below MP Water Height (H): to ft below MP Casing Radius (r): to ftThree Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: to gal Required Run Time: to min/hr
H = TD-WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow $\leq 1\text{L}$ 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
14:15					Start pump				to
14:20	14.5	1.2 L	5.5 L	6°C	7.19	43.4	3.2	192.6	31.1
14:23	21.0	1.2 L	8 L	6.1°C	6.98	51.2	4.17	199.4	16.9
14:25	DRY	1.2 L	9.75 L						to
0850	3.5	0.4	—	10°C	7.77	63.1	4.35	212.9	63.7

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
0850	3.5	0.4	10.15	10	7.77	63.1	4.35	212.9	63.7

SAMPLE ID: 10509188.0102-MBW130-U,F TIME: 0850

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 14:15 Well ID: MBW130Task: Groundwater Sampling Field Crew: TO, BJ, EYMeasuring Point (MP): TOC Water Level (WL): 1.4' ft below MPSampling Method (see applicable calculations below): purge day / sample Device: peristaltic / graduated tubing

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: to Starting PSI = $(\frac{1}{2} \text{WL} + 20)$: to
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 25.15 ft below MP Water Height (H): to ft below MP Casing Radius (r): to ftThree Purge Volumes = $3 * [Pi * r^2 * H * 7.48]$: to gal Required Run Time: to min/hr
H = TD - WL, $Pi = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
14:15	—	—	—	—	Start pump	—	—	—	to
14:20	14.5	1.2 L	5.5 L	6°C	7.19	43.4	3.2	192.6	31.1
14:23	21.0	1.2 L	8 L	6.1°C	6.98	51.2	4.17	199.4	16.9
14:25	DRY	1.2 L	9.75 L	—	—	—	—	—	to
0850	3.5	0.4	—	10°C	7.77	63.1	4.35	212.9	63.7

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0850	3.5	0.4	10.15	6	7.77	63.1	4.35	212.9	63.7

SAMPLE ID: 105610 MBW130-U,F TIME: 0850

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/14/16 Well ID: MBW131Task: Groundwater Sampling Field Crew: T. Osborn B. Jones E. YeagerMeasuring Point (MP): TOC Water Level (WL): 1.35 ft below MP (1.65)Sampling Method (see applicable calculations below): Low Flow Device: Peristaltic / dedicated tubing

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 0.42 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$:
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L

3-Volume Purge Sampling

Total Depth (TD): 7.85 ft below MP Water Height (H): 1.35 ft below MP Casing Radius (r): 1.5"Three Purge Volumes = $3 * [\text{Pi} * r^2 * H * 7.48]$: gal Required Run Time: min/ hr
H = TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1655	Start	pump							7.6
1700	1.47	0.07	0.5L	6.4	6.83	48.0	8.60	177.8	14.2
1705	1.49	0.07	0.8L	6.3	6.80	50.6	8.19	175.4	57.4
1710	1.50	0.07	1.25L	6.7	6.69	54.8	7.54	167.7	27.0
1715	1.50	0.07	1.75L	6.7	6.67	56.6	7.15	165.7	15.7
1720	1.50	0.07	2.1L	6.7	6.62	57.8	7.10	165.4	13.8
1725	1.50	0.07	2.65L	6.5	6.58	61.3	7.22	165.5	10.8
1730	1.50	0.07	3.4L	6.4	6.57	64.6	7.20	165.5	8.4
1735	1.50	0.07	3.8L	6.3	6.51	66.4	7.26	165.3	8.6
1740	1.50	0.07	4.6L	6.3	6.51	68.8	7.16	165.4	8.7
1745	1.50	0.07	5L	6.2	6.5	70.5	7.93	165.7	4.86
1750	1.50	0.07	5.45L	6.3	6.5	70.8	7.16	165.5	4.96
Continue stabilization readings on additional pages if necessary									
1755	1.50	0.07	5.9L	6.2	6.51	71.8	7.12	166.5	4.25

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1755	1.50	0.07	5.9L	6.2	6.5	71.8	7.12	166.5	4.25

SAMPLE ID: 1605 GWMBW131 - U, F TIME: 1755Final Low Flow Sampling Settings: PSI: Charge: sec Exhaust: 72 sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 05/12/16 Well ID: MBW135Task: Groundwater Sampling Field Crew: TD, BSMeasuring Point (MP): TOCN Water Level (WL): 1.55 ft below MPSampling Method (see applicable calculations below): Purge dry + Sample Device: peristaltic/tubing

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: TD Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: 30
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L

3-Volume Purge Sampling

Total Depth (TD): 19.8 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): 1.5" ftThree Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: TD gal Required Run Time: _____ min/hr
H = TD - WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (μS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0930		1L			Start				
0932		1L	2L	6.3	7.76	63.1	1.48	490.6	10.8
0935		1L	5L	6.6	7.61	48.7	1.68	492.3	5.14
0938		1L	8L	6.7	7.52	21	10.22	486.5	
0944		1L	11L		Purged	Dry			

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (μS/cm)	Turbidity (NTU)
1840	1.6	0.4L		6.7	7.04	63.0	1.60	449.3	4.11

SAMPLE ID: 16056WMBW135-U, F TIME: 1840

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

Page: 1 of 1

Sampling Method (see applicable calculations below): _____ Device: _____

Three Purge Volumes = $3 \cdot [P_i \cdot r^2 \cdot H \cdot 7.48]$: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, $P_i=3.1415$, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

[illegible][illegible]

SAMPLE ID: 1605GWMBW152-U, F TIME: 0945

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

DRY

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/10/16 Well ID: MMW006Task: Groundwater Sampling Field Crew: A. Pettley, L. RobersonMeasuring Point (MP): Top of Casing Water Level (WL): 265.51 ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder Pump/Nitrogen

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 20.6 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2 (321' (0.03 L/ft) + 0.5L)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [\pi * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, $\pi = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow \leq 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1424	265.58	—	—	8.73	7.54	127.1	0	507	0
1432	265.61	.35 L/min	3.5	8.88	7.48	130.3	4.85	517	80.7
1442	265.59	.35 L/min	7.0	9.08	7.52	132.1	4.62	520	12.8
1452	265.61	.35	10.5 11.0	9.51	7.53	130.1	5.25	520	11.1
1502	265.65	.35	14.5 15.0	9.72	7.53	128.9	5.01	521	13.9
1512	265.61	~.35	18.0	9.32	7.52	130.7	4.58	520	20.5
1522	265.61	~.35	21.5	9.26	7.50	131.9	5.33	521	45.2
1527	265.61	~.35	26.0	9.24	7.53	125.4	5.02	523	0

Bubbles formed on sensor, affected DO and Turb. Damped pump caused bubbles.

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
1527	265.61	~.35 L/min	25.0	9.24	7.53	125.4	5.02	523	0

SAMPLE ID: 1605 GW MMW006-U,F TIME: 1530Final Low Flow Sampling Settings: PSI: 150 Charge: 18 sec Exhaust: 16 sec

Downloaded from

WELL SAMPLING FORM

Page: 1 of 2Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/14/10 Well ID: MMW007Task: Groundwater Sampling Field Crew: A. Pettley, L. RodriguezMeasuring Point (MP): 70L (H) Water Level (WL): 34.75' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 6.2L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(87'(0.0342) + 0.5)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [\pi * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, $\pi = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
Stabilization Limit	± 0.3 ft	Low flow $\leq 1\text{L}$ 3-vol = no limit	2 tube vol or 3 well vol	$\pm 1\text{C}$	± 0.1	± 10	± 0.2	$\pm 3\%$	≤ 5
0911	34.75								
0920	38.11	0.75	3.0	7.70	7.01	145.2	2.37	240	0.3
0925	37.59	1.0	8.0	7.29	6.77	148.6	1.45	243	0
0940	41.05	1.0	23.0	7.54	7.00	129.6	1.29	292	0
0955	45.69	1.0	38.0	7.31	6.99	130.5	1.31	238	0
1010	56.02	1.0 ^{1.2}	53.0	7.80	7.02	134.2	2.27	229	0
1025	62.45	1.0	68.0	7.20	7.03	133.4	2.66	228	0
1040	70.34	0.6	83.0	7.62	7.08	139.3	2.77	227	0
1050	71.75	0.1	84.0	8.26	7.09	142.7	2.97	228	0
1055	71.76	0.1	84.5	9.28	7.09	143.8	2.88	230	0
1100	71.78	0.1	85.0	9.88	7.10	144.8	2.81	231	0
1105	71.85	0.1	85.5	10.10	7.10	146.1	2.59	233	0

Continue stabilization readings on additional pages if necessary

Bubbles
Filling can
sample

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
1105	71.85	0.1	85.5	10.10	7.10	146.1	2.59	233	0

See next page

SAMPLE ID: 1605 GWMW007-U, FT MS, MSD TIME: 1/20

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

• Will slow down to a steady state.

• Downloaded Transducer and Baro.

• MS/MSD Sample

Page: 2 of 2

Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/14/16 Well ID: MMW007

[illegible]

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/17/16 Well ID: MMW009Task: Groundwater Sampling Field Crew: A. Pettley, L. RodriguezMeasuring Point (MP): TOC (H) Water Level (WL): 211.05 ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Hitman

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 22' 37.1 Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(22' * 0.03L/ft) + 0.5L

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [\pi * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD-WL, $\pi = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow \leq 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	\leq 5
0930	211.05								
0945	211.15	0.25	0.75	9.54	7.47	140.1	7.52	625	0
1000	211.21	0.40	4.75	9.24	7.02	-44.6	0.51	636	0
1010	211.14	0.55	8.75	9.32	7.06	-100.2	0.13	639	2.1
1020	211.16	0.4	14.25	9.30	7.08	-56.8	0.06	639	0.8
1030	211.16	0.45	18.25	9.46	7.09	-24.5	0.04	640	0.3
1040	211.14	0.40	22.75	9.42	7.10	-14.1	0.01	640	0
1050	211.18	0.45	27.25	9.46	7.10	-11.4	0	641	0
1100	211.21	0.4	31.25	9.43	7.10	-3.8	0	640	0
1110	211.15	0.4	35.25	9.35	7.10	-1.5	0	639	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
1110	211.15	0.4	35.25	9.35	7.10	-1.5	0	639	0

SAMPLE ID: 1605 GW MMW009-01F TIME: 1110Final Low Flow Sampling Settings: PSI: 120 Charge: 17 sec Exhaust: 25 sec

Transfer and Bar Download

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/12/16 Well ID: MMW010Task: Groundwater Sampling Field Crew: A. Petty, R. AdyjaMeasuring Point (MP): 70' x1 Water Level (WL): 0.55' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Cypress

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 2.7L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(29(0.03) + 0.5)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1601	0.55								
1608	1.00	1.0	2.0	8.02	6.74	169.1	2.24	1717	1.1
1613	1.38	1.0	5.0	7.57	6.47	176.5	0.75	1792	0
1618	1.60	1.0	10.0	7.25	6.43	177.0	0.56	1798	0
1623	1.61	1.0	15.0	7.08	6.43	176.8	0.33	1797	0
1628	1.65	1.0	20.0	7.11	6.44	176.2	0.41	1794	0
1633	1.61	1.0	25	7.04	6.45	175.9	0.73	1793	0

Continue stabilization readings on additional pages if necessary

DO unstable possibly due to aeration well effect.

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1633	1.61	1.0	25	7.04	6.45	175.9	0.73	1793	0

SAMPLE ID: 1605G MMW010-V1F TIME: 1633Final Low Flow Sampling Settings: PSI: 20 Charge: 9 sec Exhaust: 7 sec

Transducer Download

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/12/16 Well ID: MMW011Task: Groundwater Sampling Field Crew: A. Pettley L. RodinMeasuring Point (MP): T0C M Water Level (WL): 73.55' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder / Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 7.7L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2 (112'(.03) + .5)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [\text{Pi} * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD - WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1107	73.55								
1125	73.75	.25	1.3	10.14	7.35	79.7	5.91	837	0
1130	73.76	.25	2.5	10.18	7.30	83.1	5.77	836	0
1135	73.75	.25	3.75	10.17	7.29	85.2	5.72	836	0
1140	73.75	.25	5.0	10.22	7.28	88.0	5.69	835	0
1145	73.75	.25	6.25	10.25	7.28	89.5	5.70	834	0
1150	73.75	.25	7.5	10.25	7.28	92.4	5.76	833	0
1155	73.75	.25	8.75	10.31	7.28	94.4	5.73	833	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1155	73.75	0.25	8.75	10.31	7.28	94.4	5.73	833	0

SAMPLE ID: 1605 GW MMW011 - U1F TIME: 1155Final Low Flow Sampling Settings: PSI: 40 Charge: 13 sec Exhaust: 13 sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/14/16 Well ID: MMW013Task: Groundwater Sampling Field Crew: A Pettley L RodriguezMeasuring Point (MP): TOC H Water Level (WL): 3.25' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = $2 \times (\text{feet} \times \text{vol tubing} + \text{vol pump})$: 2.86 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2 (31' (0.37L) (0.5))

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 \times [\text{Pi} \times r^2 \times H \times 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1433	3.25								
1438	3.35	0.7	3.0	7.74	7.06	163.4	8.28	686	0
1443	3.33	0.85	6.5	7.48	6.94	165.5	8.91	685	0
1448	3.30	0.85	10.75	7.40	6.93	166.7	8.94	684	0
1453	3.30	0.8	14.75	7.37	6.91	169.2	8.97	680	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1453	3.30	0.8	14.75	7.37	6.91	169.2	8.97	680	0

SAMPLE ID: 10509188.0102 - U.F TIME: 1453Final Low Flow Sampling Settings: PSI: 10 Charge: 10 sec Exhaust: 9 sec

Doubled Tuber

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/11/16 Well ID: MMW017Task: Groundwater Sampling Field Crew: A. Rettley, L. RadtkeMeasuring Point (MP): TOC (N) Water Level (WL): 38.68 ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 4.36L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2 (54(.034ft) + .5)

3-Volume Purge Sampling

Total Depth (TD): 56 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ftThree Purge Volumes = $3 * [Pi * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1608	38.68								
1635	38.95	.05	1.2	11.11	6.89	156.8	6.67	1381	0
1645	38.95	.05	1.5	11.15	6.85	160.6	6.56	1329	0
1655	38.95	.04	1.9	11.25	6.84	163.1	6.44	1328	0
1705	38.96	.045	2.34	11.22	6.83	165.0	6.37	1378	0
1715	38.96	.04	2.9	11.17	6.82	165.1	6.21	1380	0
1725	38.94	.04	3.3	11.06	6.83	166.2	6.26	1380	0
1735	38.96	.04	3.7	10.90	6.82	167.8	6.23	1329	0
1745	38.77	.04	4.0	10.77	6.82	169.4	6.19	1329	0
1755	38.77	.04	4.4	10.63	6.82	171.2	6.26	1329	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1755	38.77	.04	4.4	10.63	6.82	171.2	6.26	1329	0

SAMPLE ID: 16056W MMW017-0, F TIME: 1755

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/11/16 Well ID: MMW018Task: Groundwater Sampling Field Crew: A. Pettley, L. RoduzinMeasuring Point (MP): 70C N Water Level (WL): 8.46' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder / Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 2089.2.8L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(30'(0.034ft) + 0.5L)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [\pi * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD - WL, $\pi = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow \leq 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	\leq 5
1032	8.46								
1043	8.61	.15	1.5	7.51	7.36	161.0	7.73	418	0
1053	8.62	.1	2.6	8.50	7.32	161.8	7.64	418	0
1103	8.63	.15	3.75	7.26	7.31	162.5	7.15	420	0
1113	8.66	.1	4.0	7.21	7.28	163.7	7.04	420	0
1123	8.65	.1	5.0	7.64	7.29	160.4	7.03	419	0

Needed to
tighten
discharge
fitting, DO
may have been
affected

Needed to
ramp down
rate.

Continue stabilization readings on additional pages if necessary

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
1123	8.65	0.1	5.0	7.64	7.29	160.4	7.03	419	0

SAMPLE ID: 1605 GW MMW018-U, F, MS, SDS TIME: 1125Final Low Flow Sampling Settings: PSI: 5 Charge: 5 sec Exhaust: 8 sec

Downloaded Transducer
Samples for MS/MSD

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/15/16 Well ID: mmw020Task: Groundwater Sampling Field Crew: A. Petley, T. OsbornMeasuring Point (MP): TOCN Water Level (WL): 274.25 ft below MPSampling Method (see applicable calculations below): Low flow Device: Bladder/Nitrogen

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 25.5 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]Tube Length 403 3-Volume Purge SamplingTotal Depth (TD): 408 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ftThree Purge Volumes = $3 * [\text{Pi} * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1010	274.25	-	2	8.10	7.41	187.1	9.39	1410	83.4
1020	274.25	-	4	8.35	7.03	186.6	6.69	836	3.5
1030	274.25	-	8.5	8.63	6.96	185.4	1.48	920	2.8
1040	274.24	-	13	8.60	6.96	180.7	0.71	917	2.2
1050	274.24	-	23	8.71	6.96	176.9	0.45	913	1.6
1100	274.24	-	31.5	8.72	6.96	173.5	0.28	905	1.4
1110	274.24	-	41.5	8.71	6.96	172.1	0.22	903	1.8

Continue stabilization readings on additional pages if necessary

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1120	274.25	-	49.5	8.77	6.96	164.7	0.20	899	0.8

SAMPLE ID: 1005GWMMW020-F, U TIME: 1120Final Low Flow Sampling Settings: PSI: 165 Charge: 21 sec Exhaust: 27 sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/10/16 Well ID: MMW021Task: Groundwater Sampling Field Crew: A. Pettley, L. PalingerMeasuring Point (MP): TOLN Water Level (WL): 209.92' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder Pump/Nitrogen / Air compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 15.5L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L 2(242' (0.375) + 0.5L)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow \leq 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1242	210.03	.25 L/min	2L	8.24	7.27	127	0	622	0
1252	210.11	.3 L/min	2.5L	8.59	7.21	131.5	6.37	631	0
1302	210.11	.25 L/min	8L	9.21	7.20	129.5	6.21	630	0
1312	210.12	.3 L/min	11L	9.15	7.20	130.2	6.21	630	0
1322	210.12	.3 L/min	14L	8.95	7.19	132.3	6.22	628	0
1332	210.12	.3 L/min	17L	9.35	7.20	133.5	6.20	628	0
1337	210.12	.3 L/min	18.5L	8.99	7.20	134.4	6.22	627	0
1342	210.12	.3 L/min	20L	9.52	7.19	133.3	6.16	625	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
1342	210.12	.3 L/min	20L	9.52	7.19	133.3	6.16	625	0

SAMPLE ID: 16056WMMW021-U,F TIME: 1342Final Low Flow Sampling Settings: PSI: 120 Charge: 17 sec Exhaust: 21 sec

Downloaded Transducer

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/12/16 Well ID: MMW022Task: Groundwater Sampling Field Crew: A. Pethay, L. RodriguezMeasuring Point (MP): 706 (H) Water Level (WL): 201.95 ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Extractor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 20.5 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2 (325 (0.03/ft) * 5)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [Pi * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1347	201.95	0.25							
1400	202.08	.25	.75	10.45	7.78	100.2	9.10	780	0
1410	202.05	.25	3.25	10.60	7.27	112.7	5.58	896	0
1420	202.13	.25	5.75	9.98	7.08	119.9	3.99	924	0
1440	202.15	.25	8.25	9.81	7.09	129.3	4.27	933	4.2
1450	202.13	.25	10.5	9.72	7.09	132.6	4.27	929	2.6
1500	202.13	.25	12.75	10.05	7.10	135.9	4.28	924	0.6
1510	202.16	.25	15.25	9.81	7.10	139.7	4.30	925	0.7
1520	202.11	.25	17.75	9.82	7.10	143.6	4.32	931	0
1530	202.16	.25	20.25	9.69	7.10	147.2	4.36	925	0
1535	202.11	.25	21.5	9.45	7.10	149.7	4.33	925	1.3

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1535	202.11	.25	21.5	9.45	7.10	149.7	4.33	925	1.3

SAMPLE ID: 1605 GWMMW022-U,F TIME: 1535Final Low Flow Sampling Settings: PSI: 110 Charge: 8 sec Exhaust: 25 sec

Download Trench

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/12/16 Well ID: MMW023Task: Groundwater Sampling Field Crew: A. Pettley, L. RodriguezMeasuring Point (MP): TOL N Water Level (WL): 106.60' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 22.1 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(352(0.037ft) + 0.5L)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD - WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0943	106.60								
0955	106.60	.85	83.0L	9.26	6.90	-98.9	0.36	974	0
1005	106.60	.85	11.5	9.14	6.93	-105.2	0.07	926	0
1015	106.61	.85	20.0	9.14	6.98	-111.2	0.03	996	0
1020	106.62	.85	24.25	9.18	6.99	-108.5	0.03	990	0
1025	106.62	.85	28.5	9.16	6.99	-113.3	.02	983	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1025	106.62	.85	28.5	9.16	6.99	-113.3	.02	983	0

SAMPLE ID: 1605 GW MMW023 - V.F. TIME: 1025Final Low Flow Sampling Settings: PSI: 90 Charge: 10 sec Exhaust: 10 sec

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WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/14/16 Well ID: mmw024Task: Groundwater Sampling Field Crew: A. Pottley L. PodyMeasuring Point (MP): TOC H Water Level (WL): 54.19 ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 11.7 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(145 * (0.03/ft) 1.50)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [\text{Pi} * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1353	54.19								
1402	54.35	.8	2.5	8.61	7.21	143.9	2.22	933	0
1407	54.30	.8	6.5	8.49	7.08	148.5	2.41	1018	0
1412	54.29	.75	10.25	8.23	7.07	150.2	2.31	1025	0
1417	54.29	.75	14.0	8.07	7.07	152.1	2.30	1026	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1417	54.29	.75	14.0	8.07	7.07	152.1	2.30	1026	0

SAMPLE ID: 1605GWMMW024-VIF TIME: 1417Final Low Flow Sampling Settings: PSI: 105 Charge: 17 sec Exhaust: 9 sec

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WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/09/16 Well ID: MMW025Task: Groundwater Sampling Field Crew: A. Pettley, L. RodriguezMeasuring Point (MP): Top of well casing Water Level (WL): 27.30' ft below MPSampling Method (see applicable calculations below): _____ Device: Bladder / Regulator / Nitrogen

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: _____ Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L

3-Volume Purge Sampling

Total Depth (TD): 200 ft below MP Water Height (H): 172.7 ft below MP Casing Radius (r): 0.167 ftThree Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 0.1 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1527	27.3'								
1620	33.6	.7		7.88	7.61	121.5	1.19	299	0
1630	36.3	.7		7.68	7.82	120.6	1.08	299	0
1640	39.00	.7		7.60	7.88	115.6	1.07	298	0
	Leak to purge on 5/9/16, Return 5/14/16 for syring								
1145	38.61								
1205	39.17	.2	.5	11.08	7.87	128.7	3.66	288	0
1210	39.67	0.2	2.5	9.29	7.89	129.9	1.57	291	0
1215	40.16	0.2	3.5	9.88	7.92	129.0	1.28	289	0
1220	40.70	0.2	4.5	9.73	7.94	128.1	1.22	290	0
1225	40.10	0.2	5.5	9.88	7.95	128.3	1.16	289	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS									
Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
1225	40.10	0.2	5.5	9.88	7.95	128.3	1.16	289	0

SAMPLE ID: 1605GWMW025-01F TIME: 1225Final Low Flow Sampling Settings: PSI: 100 Charge: 60 sec Exhaust: 14 sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/10/16 Well ID: MMWD26Task: Groundwater Sampling Field Crew: A. Pettley, L. RodriguezMeasuring Point (MP): TOC N Water Level (WL): 284.65' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder / Mustang

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 21.7 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(245' * (0.03/ft) + 0.5)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD - WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1037	284.7		2.75	9.13	7.30	-6.4	0.38	429	-0.2
1047	284.7	.65 ¹ / _{min}	9.25	10.17	7.46	12.1	0.06	429	-0.7
1057	284.7	.65 ¹ / _{min}	15.75	10.19	7.47	27.0	0.01	428	-0.9
1107	284.7	.65 ¹ / _{min}	22.25	10.02	7.47	36.1	0.01	428	-0.9
1112	284.7	.65 ¹ / _{min}	26.5	10.03	7.47	39.2	0.03	428	-0.9
1117	284.7	.65 ¹ / _{min}	28.75	10.01	7.47	41.9	0.03	428	-0.9
1122	284.7	.65 ¹ / _{min}	32.0	9.89	7.46	45.4	0.04	427	-0.9
1127	284.7	.65 ¹ / _{min}	35.25	9.78	7.46	48.6	0.05	427	-0.9

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1127	284.7	.65 ¹ / _{min}	35.25	9.78	7.46	48.6	0.05	427	0

SAMPLE ID: 1605MMWD26-U,F TIME: 1127Final Low Flow Sampling Settings: PSI: 205 Charge: 20 sec Exhaust: 25 sec

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WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/17/16 Well ID: MWW027Task: Groundwater Sampling Field Crew: A Pottler L RodriguezMeasuring Point (MP): TOL N Water Level (WL): 91.69' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 7.9L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2015' (0.037 ft) * 0.5

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1204	91.69			8.49	7.25	91.3	4.29	1101	0
1215	91.75	.55	2.5	8.49	7.25	91.3	4.29	1101	0
1220	91.75	.55	4.0	8.27	7.10	98.1	3.33	1116	0
1225	91.75	.55	6.25	8.17	7.08	100.4	3.15	1118	0
1230	91.75	.55	9.50	8.07	7.07	102.4	3.12	1117	0
1235	91.75	.55	12.25	8.34	7.07	104.9	3.09	1115	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1235	91.75	.55	12.25	8.34	7.07	104.9	3.09	1115	0

SAMPLE ID: 1605 GWMWW027-V,F TIME: 1235Final Low Flow Sampling Settings: PSI: 70 Charge: 10 sec Exhaust: 15 sec

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WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/12/14 Well ID: MMW028Task: Groundwater Sampling Field Crew: A. Pettler, L. RadwinMeasuring Point (MP): TOL H Water Level (WL): 63.96' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder (compressor)

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 6.4 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(90'(0.039ft) + 0.5)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1225	63.96								
1235	63.96	.75	1.5	8.64	7.73	83.3	7.03	568	0
1240	63.96	.8	5.5	8.46	7.53	92.6	6.96	568	0
1245	63.96	.8	9.5	8.42	7.52	95.7	6.95	566	0
1250	63.96	/	/	8.72	7.53	98.0	6.90	565	0
1255	63.96	.75	12.25	8.35	7.53	101.2	6.88	565	0

Continue stabilization readings on additional pages if necessary

* Don't stop
air pressure
on compressor
needed to start

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1255	63.96	.75	12.25	8.35	7.53	101.2	6.88	565	0

SAMPLE ID: 10509188.0102 TIME: 1255, 121010509188.0102-1,2-0,FFinal Low Flow Sampling Settings: PSI: 50 Charge: 15 sec Exhaust: 10 sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/11/16 Well ID: MMW029Task: Groundwater Sampling Field Crew: A. Rettler, L. RodinMeasuring Point (MP): 10LH Water Level (WL): 13.46 ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 4.3 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(55' * 0.03/ft) + 0.5

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [Pi * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1213	13.46								
1220	13.64	0.7	2.25	8.07	7.17	163.8	5.28	1556	0
1225	13.65	0.45	4.5	8.07	7.10	165.1	6.27	1558	0
1230	13.64	0.45	6.75	8.13	7.03	166.9	6.79	1557	0
1235	13.64	0.40	8.75	8.13	6.98	169.2	7.04	1560	0
1240	13.64	0.40	10.75	8.08	6.97	170.4	7.18	1560	0
1245	13.64	0.40	12.75	8.10	6.95	171.9	7.25	1560	0
1250	13.64	0.40	14.75	8.12	6.94	174.1	7.29	1562	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1250	13.64	0.40	14.75	8.12	6.94	174.1	7.29	1562	0

SAMPLE ID: 1605GW MMW029-0,F TIME: 1250Final Low Flow Sampling Settings: PSI: 30 Charge: 7 sec Exhaust: 10 sec

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WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/10/16 Well ID: MMW030Task: Groundwater Sampling Field Crew: A. Petley, L. RodriguezMeasuring Point (MP): TOL N Water Level (WL): 21.90 ft below MPSampling Method (see applicable calculations below): Purge and Sample Device: Bladder/Compressor
Bladder/Nitrogen
Low Flow SamplingMinimum Purge = $2 \times (\text{feet} \times \text{vol tubing} + \text{vol pump})$: 10.3 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 155 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ftThree Purge Volumes = $3 \times [\text{Pi} \times r^2 \times H \times 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1705	21.90								
1720	22.85	1.04/min	2.5	8.83	7.62	66.8	0	413	0
1725	25.43	1.04/min	7.5	8.98	7.62	65.3	0.93	416	0
1745	35.15	1.04/min	27.5	8.95	7.60	65.1	0.73	416	0
1800	41.4	1.04/min	32.5	8.92	7.60	73.9	1.71	416	0.41
0840	143.02	hearing nitrogen bottle at well site to purge overnight. Well purged dry during the night. Will let recharge before sampling.							
1310	29.11	Well has recovered to > 80% started sampling							
1320	29.60	-	.75	8.46	7.80	145.8	4.62	410	1.3
1325	30.40	-	2.5	8.36	7.75	145.2	2.55	407	4.2
1335	30.93	-	4	8.64	7.72	143.3	2.50	405	0.1
			10						

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1340	33.00	-	10	8.72	7.72	142.5	2.53	405	0

SAMPLE ID: 1605GWMMW030-FU TIME: 1340Final Low Flow Sampling Settings: PSI: 70 Charge: 15 sec Exhaust: 15 sec

Downloaded Transducer and Barometer

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/13/16 Well ID: MMW031Task: Groundwater Sampling Field Crew: A. Pottley L. RodriguezMeasuring Point (MP): 20C (N) Water Level (WL): 97.63' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder / Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 12.7 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2 (1.95' (.03 L/ft) + .5L)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [Pi * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1637	97.63								
1640	97.77	.70	2.5L	9.99	7.89	114.6	9.03	265	0
1645	97.83	0.85	6.0	9.74	7.82	119.7	9.35	263	0
1650	97.83	.75	9.75	9.56	7.82	123.3	9.41	261	0
1655	97.83	.70	13.35	9.62	7.81	127	9.47	260	0
1700	97.83	.85	16.00	9.57	7.82	128	9.37	260	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1700	97.83	0.85	16.00	9.57	7.82	128	9.37	260	0

SAMPLE ID: 1605GW MMW031 -U, F TIME: 1700Final Low Flow Sampling Settings: PSI: 110 Charge: 8 sec Exhaust: 9 sec

David L. Tuckman

WELL SAMPLING FORM

Page: 1 of 2Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/11/16 Well ID: MMW032Task: Groundwater Sampling Field Crew: A. Pettibone, L. RodriguezMeasuring Point (MP): TOL N Water Level (WL): 18.25 ft below MPSampling Method (see applicable calculations below): Purge and Sample Device: Bladder Pump/compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 4.9 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 65 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ftThree Purge Volumes = $3 * [Pi * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H= TD-WL, Pi=3.1415, 1gal = 3.785L, 4in casing=0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
0903	18.25	—	—	—	—	—	—	—	—
0915	20.45	1.75	4L	6.40	7.08	164.4	6.22	383	0
0925	27.91	2.25	24.5	6.25	7.36	157.8	6.39	379	0
0935	37.05	2.25	47.0	6.28	7.50	150.7	6.71	378	0
0945	46.02	2.25	69.5	6.23	7.53	148.2	6.77	378	0
0955	53.45	2.0	89.5	6.25	7.54	149.7	6.77	378	0
1005	58.45	1.25	102.0	6.28	7.55	150.5	6.79	380	0
1014	60.84	slow	113.25	6.3	7.51	151.7	6.57	377	0
1016	Allowing to recharge from full purge	—	—	—	—	—	—	—	—
5/15/16 0855	16.55	—	.75	6.21	7.16	210.4	7.26	389	3
0900	19.30	.75	5.75	6.16	7.25	200.2	6.84	386	0
0905	21.00	.75	10.25	6.14	7.31	195.5	6.81	383	0.2

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
0915	22.80	.75	15.0	6.13	7.36	190.2	7.06	382	0

SAMPLE ID: 16056WMMW032-F, U TIME: 0915Final Low Flow Sampling Settings: PSI: 30 Charge: 9 sec Exhaust: 10 sec

No Transducer

Page: 2 of 2[illegible]

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/11/16 Well ID: MMW033Task: Groundwater Sampling Field Crew: A. Pettley, L. RodriguezMeasuring Point (MP): TOC N Water Level (WL): 6.29' ft below MPSampling Method (see applicable calculations below): 3 Volume Purge Device: Bladder Pump/Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 10 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2 * (150' * 0.03) + 0.5

3-Volume Purge Sampling

Total Depth (TD): 150 ft below MP Water Height (H): 6.29 ft below MP Casing Radius (r): 0.167 ftThree Purge Volumes = $3 * (\pi * r^2 * H * 7.48)$: 282.55 gal Required Run Time: _____ min/ hr
H = TD - WL, $\pi = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ftH = 150 - 6.29 = 143.71' 3V = 3 * (\pi * (0.167)^2 * (143.71) * 7.48) = 282.55 L

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow \leq 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1305	6.29'								
1315	9.02	1.5 $\frac{\text{L}}{\text{min}}$	15L	8.90	6.96	175.1	0	473	0
1325	13.96	1.5 $\frac{\text{L}}{\text{min}}$	30L	6.66	7.79	78.0	0.23	473	0
1335	16.55	1.5 $\frac{\text{L}}{\text{min}}$	45L	6.57	7.79	53.1	0	472	0
1345	19.15	1.5 $\frac{\text{L}}{\text{min}}$	60L	6.63	7.76	46.7	0	469	0
1355	22.17	1.5 $\frac{\text{L}}{\text{min}}$	75L	6.66	7.74	47.1	0	468	0
1405	24.32	1.5 $\frac{\text{L}}{\text{min}}$	90L	6.65	7.71	47.6	.03	465	0
1415	26.286	1.5 $\frac{\text{L}}{\text{min}}$	105L	6.66	7.70	49.2	0.05	465	0

* Issues w/ some DO readings @ zero, not making

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
1415	26.26	1.5 $\frac{\text{L}}{\text{min}}$	105L	6.66	7.70	49.2	0.05	465	0

SAMPLE ID: 1605GW MMW033-U,F TIME: 1415Final Low Flow Sampling Settings: PSI: 23 Charge: 23 sec Exhaust: 10 sec

No Turbidity

* See comment on field notebook pertaining to sampling method.

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/14/16 Well ID: MMW034Task: Groundwater Sampling Field Crew: A. Pothay, L. PodgynMeasuring Point (MP): TOC (N) Water Level (WL): 7.01' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 10.02 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 20(7.03/4) + 0.5

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD - WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow \leq 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1501	7.10								
1505	7.25	.35	1.75	7.79	6.91	172.1	8.76	680	0
1510	7.30	.35	3.5	7.79	6.91	172.1	8.76	680	0
1515	7.30	0.35	5.25	7.79	6.91	172.1	8.76	680	0
1520	7.30	0.35	7.0	7.79	6.91	172.1	8.76	680	0
1525	7.30	0.35	8.75	8.41	7.35	156.0	8.99	558	0
1530	7.30	0.35	10.50	8.31	7.35	157.5	9.14	558	0
1535	7.31	0.35	12.25	8.28	7.35	159.5	9.40	556	0.7
1540	7.31	0.35	14.0	8.30	7.36	161.6	9.32	555	0
1545	7.31	0.35	15.75	8.12	7.36	164.6	9.51	554	0

Re-start
sands filter
up.

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity ($\mu\text{S/cm}$)	Turbidity (NTU)
1545	7.31	0.35	15.75	8.12	7.36	164.6	9.51	554	0

SAMPLE ID: MMW034 1605 GWMMW034-1,2-F,U TIME: 1510

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/13/16 Well ID: MMW035Task: Groundwater Sampling Field Crew: A. Rettley, L. RodriguezMeasuring Point (MP): 10C (N) Water Level (WL): 92.81 ft below MPSampling Method (see applicable calculations below): Low Flow Device: Bladder/Compressor

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 13.3L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(205 (0.03/ft) + 0.5)

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD-WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1245	92.81	.45							
1250	92.88	.45	2.5	8.30	7.03	108.4	1.83	1444	0
1255	92.88	.45	4.75	8.20	6.96	111.5	2.10	1459	0.2
1300	92.87	.45	7.0	8.17	6.95	115.2	2.10	1458	0
1305	92.85	.45	9.25	8.30	6.95	116.9	2.08	1456	0
1310	92.87	.45	11.5	8.29	6.95	118.7	2.08	1456	0
1315	92.87	.45	13.75	8.29	6.95	120.3	2.06	1456	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1315	92.87	.45	13.75	8.29	6.95	120.3	2.06	1456	0

SAMPLE ID: 1005GWMMW038-U,F TIME: 1315Final Low Flow Sampling Settings: PSI: 100 Charge: 9 sec Exhaust: 11 sec

Dawned Transducer

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/13/16 Well ID: MMW036Task: Groundwater Sampling Field Crew: A. Pottier, L. RodriguezMeasuring Point (MP): TDC (M) Water Level (WL): 112.63 ft below MPSampling Method (see applicable calculations below): Low Flow Device: _____

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 9.8 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 20476.07(4) + 0.5

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [P_i * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD-WL, $P_i = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1511	112.63								
1515	112.68	.35	1.5 L	10.20	7.66	138.7	8.66	424	0
1520	112.63	.35	3.25	9.37	7.57	137.4	7.90	424	0
1525	112.63	.35	5.0	9.04	7.52	140.0	7.54	423	0
1530	112.63	.35	6.75	9.03	7.52	141.3	7.46	422	0
1535	112.63	.4	8.25	8.99	7.52	141.8	7.47	422	0
1540	112.66	.4	10.25	9.00	7.52	142.2	7.51	421	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1540	112.66	0.4	10.25	9.00	7.52	142.2	7.51	421	0

SAMPLE ID: 16056W MMW036 TIME: 1540Final Low Flow Sampling Settings: PSI: 90 Charge: 7 sec Exhaust: 20 sec* Issues w/ bladder pump causing lots of bubbles to come out of bag,
settling on DO sensor on sonde. High DO readings.

Downloaded Transducers, MS/MSD

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/13/16 Well ID: MMW037Task: Groundwater Sampling Field Crew: A. Pettley L RodriguezMeasuring Point (MP): LOC N Water Level (WL): 113.30 ft below MPSampling Method (see applicable calculations below): Low Flow Device: _____

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 20.1 L Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L] 2(3.4(0.034ft)) + 0.5L

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 * [Pi * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1355	113.30								
1410	113.35	0.4	2.0	9.77	7.57	104.5	5.66	436	0
1420	113.35	0.4	6.0	9.63	7.52	114.1	7.57	435	0
1430	113.35	0.4	10.0	9.53	7.52	120.8	7.60	434	0
1440	113.35	0.4	14.0	9.64	7.51	128.0	7.77	432	0
1450	113.35	0.4	18.0	9.83	7.51	133.1	7.74	430	0
1500	113.35	0.35	21.5	9.60	7.51	137.8	7.76	428	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1500	113.35	0.35	21.5	9.60	7.51	137.8	7.76	428	0

SAMPLE ID: 16056WMMW037-1,2-U,F TIME: 1500, 1410Final Low Flow Sampling Settings: PSI: 150 Charge: 16 sec Exhaust: 17 sec

- Duplicate

- Random Downhole

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/15/16 Well ID: MW-15ATask: Groundwater Sampling Field Crew: A. Pettley, T. OsbornMeasuring Point (MP): TOLN Water Level (WL): 18.34 ft below MPSampling Method (see applicable calculations below): Low Flow Device: Parastatic

Low Flow Sampling

Minimum Purge = $2 * (\text{feet} * \text{vol tubing} + \text{vol pump})$: 3.2 Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L]

3-Volume Purge Sampling

Total Depth (TD): 36.66 ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ftThree Purge Volumes = $3 * [\text{Pi} * r^2 * H * 7.48]$: _____ gal Required Run Time: _____ min/ hr
H = TD-WL, Pi = 3.1415, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1205	19.25	.25	2.5	7.69	6.78	174.8	3.14	1655	0
1215	19.55	-	2.5	7.94	6.71	173.8	3.53	1673	0.1
1225	19.56	-	4.5	7.96	6.71	173.4	3.50	1678	0.4
1230	19.56	.25	5.75	7.97	6.70	173.1	3.53	1680	0.1
1235	19.65	-	7.5	7.98	6.71	173.1	3.51	1680	0.3
1240	19.60	-	8.0	7.99	6.71	172.8	3.51	1677	0.6

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1240	19.60	-	8.0	7.99	6.71	172.8	3.51	1677	0.6

SAMPLE ID: 16056WMW15A-F, U TIME: 1240Final Low Flow Sampling Settings: PSI: - Charge: - sec Exhaust: - sec

Note: Draw down 1.21' ft from beginning water level then started Low Flow.

WELL SAMPLING FORM

Page: 1 of 1Project No.: 10509188.0102 Client: P4 Spring 2016 Date: 5/10/16 Well ID: MWW-016ATask: Groundwater Sampling Field Crew: A. Pettley, L. RodriguezMeasuring Point (MP): T0C N Water Level (WL): 4.39' ft below MPSampling Method (see applicable calculations below): Low Flow Device: Peristaltic

Low Flow Sampling

Minimum Purge = $2 \times (\text{feet} \times \text{vol tubing} + \text{vol pump})$: _____ Starting PSI = $(\frac{1}{2} \text{ WL} + 20)$: _____
Tubing vol = 0.03L/ft, Bladder pump vol = 0.5L

3-Volume Purge Sampling

Total Depth (TD): _____ ft below MP Water Height (H): _____ ft below MP Casing Radius (r): _____ ft

Three Purge Volumes = $3 \times [\pi \times r^2 \times H \times 7.48]$: _____ gal Required Run Time: _____ min/hr
H = TD-WL, $\pi = 3.1415$, 1gal = 3.785L, 4in casing = 0.653gal/ft, 6in casing = 1.469gal/ft

STABILIZATION READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
Stabilization Limit	+/- 0.3 ft	Low flow ≤ 1L 3-vol = no limit	2 tube vol or 3 well vol	+/- 1C	+/- 0.1	+/- 10	+/- 0.2	+/- 3%	≤ 5
1555	4.39								
1605	5.41	.254/min	1.5L	6.77	7.42	-79.1	1.43	1489	0
1610	5.85	.254/min	2.5L	6.87	7.38	-70.7	0.60	1496	0
1615	6.07	.34/min	4.0L	6.79	7.36	-72.0	0.30	1552	0
1620	6.3	.34/min	5.5L	6.76	7.32	-73.9	.21	1602	0
1625	6.60	.34/min	7.0L	6.81	7.33	-74.9	.14	1614	0
1630	6.61	.3	8.5L	6.74	7.32	-75.0	0.07	1634	0
1635	6.70	.3	10.0L	6.78	7.33	-75.5	0.04	1641	0
1640	6.78	.3	11.5	6.80	7.33	-76.5	0.03	1641	0
1645	6.82	.3	13.0	6.80	7.33	-77.6	0	1649	0
1650	6.88	.3	14.5	6.73	7.33	-78.2	0	1655	0

Continue stabilization readings on additional pages if necessary

FINAL READINGS

Time (24 Hr)	Water Level (ft below MP)	Purge Rate (gal or L/min)	Cumulative Purge Vol (gal or L)	Temp (C)	pH	ORP/Eh (mv)	DO (mg/L)	Specific Conductivity (µS/cm)	Turbidity (NTU)
1650	6.88	0.3	14.5	6.73	7.33	-78.2	0	1655	0

SAMPLE ID: 1605 GWM DAW 16A - U.F TIME: 1650

Final Low Flow Sampling Settings: PSI: _____ Charge: _____ sec Exhaust: _____ sec

Downloaded Transducer, no lock.

2016 Spring Surface Water Sampling Field Forms

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/13/16 Arrival Time 1450

Field Personnel

T. Osborn

Signatures

B. Jones

SITE DESCRIPTION

Station Name West Dump Seep Station Number MDS025

Latitude N ° on file Longitude W ° on file

Elevation on file ft Datum NAD 27 Photo Number

Site & Stream Description seep coming out of multiple places on hillside amongst willows

Surface Water Characteristics (color, odor, appearance): clear, slight organic odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream) Across-stream

Sample ID: 1605SWMDS025-U, F Sample Time: 1455

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1455	T2	
Water Temperature (°C)	11.0°C		
Specific Conductivity (µS/cm) @ 25° C	1333		
Conductivity (µS/cm)	977		
TDS (g/L)	— 70		
Dissolved Oxygen (% sat.)	53.3		
Dissolved Oxygen (mg/L)	5.74		
pH	7.06		
ORP (mV)	28.2		
Turbidity (FTU) NTU	12.4 NTU		
Air Temperature (°C) °F	50°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program -- Spring 2016 SW Sampling

Date 5 / 13 / 16 Time 1500 Station Number MDS025

Completed by: TJ. BJ Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement <u>0.2</u> <u>0.6</u> <u>0.8</u> (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement <u>0.2</u> <u>0.6</u> <u>0.8</u> (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

No Flow Seeps coming out of multiple places on hill side

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/31/16 Arrival Time 15:50

Field Personnel

T. Osborn

Signatures

B. Jones

SITE DESCRIPTION

Station Name South Pump Seep Station Number MDS026

Latitude N ° 0N 11k " Longitude W ° 01 11k "

Elevation on 11k ft Datum NAD 27 Photo Number MDS0260

Site & Stream Description Seep daylighting in multiple spots across hill side ~30' wide tall grass + willows

Surface Water Characteristics (color, odor, appearance): clear odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream) Across-stream

Sample ID: 16059W/MDS026-U,F Sample Time: 15:55

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	15:55		
Water Temperature (°C)	9.9°C		
Specific Conductivity (µS/cm) @ 25° C	1869		
Conductivity (µS/cm)	1331		
TDS (g/L)	TD		
Dissolved Oxygen (% sat.)	48.1		
Dissolved Oxygen (mg/L)	5.30		
pH	7.01		
ORP (mV)	56.2		
Turbidity (FTU) NTU	17.7 NTU		
Air Temperature (°C) °F	52°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5 / 13 / 16 Time 16:00 Station Number MDS026

Completed by: BJ, TD Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Seeps coming out of multiple places on hillside ~ 30' wide. Unable to get flow

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program - Spring 2016 SW Sampling

Date 5/10/16 Arrival Time 9:30am

Field Personnel

T. Osborn B. Jones

Signatures

G. Neang

[Signature]

SITE DESCRIPTION

Station Name Pit #2 Upper Dump Seep Station Number MOS030

Latitude N ° on file Longitude W ° on file

Elevation on file ft Datum NAD 27 Photo Number 3

Site & Stream Description Seep coming out of hill side beneath
tree surrounded by shale dump

Surface Water Characteristics (color, odor, appearance): clear odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: 1605 SW MOS030-1R-F,U Sample Time: 9:40 am

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	0930	0940	
Water Temperature (°C)	8.1°C	8.3°C	
Specific Conductivity (µS/cm) @ 25° C	944	934	
Conductivity (µS/cm)	640	637	
TDS (g/L)	TO	TO	
Dissolved Oxygen (% sat.)	64.5%	54.5	
Dissolved Oxygen (mg/L)	7.31	6.28	
pH	7.47	7.14	
ORP (mV)	92.6	97.4	
Turbidity (FTU)	0.24	0.27	
Air Temperature (°C) <u>OF</u>	35°F	35°F	

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16

Time 9:49 am

Station Number MDS 030

Completed by: B.S. E. To

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	3.23	1.25
2	3.80	1.4
3	3.81	1.4

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
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	11						
	12						
	13						
	14						
	15						

10

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program - Spring 2016 SW Sampling

Date 5/12/16 Arrival Time 12:45

Field Personnel

T. Osborn

Signatures

B. Jones

SITE DESCRIPTION

Station Name Henry Mine, Dump Seep #3

Station Number MDS 034

Latitude N ° on file " Longitude W ° on file "

Elevation on file ft Datum NAD 27 Photo Number

Site & Stream Description Dump seep coming out of hill side
(waste pile) pooling in meadow

Surface Water Characteristics (color, odor, appearance): light greenish brown
slight organic odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other() Up-stream / Across-stream

Sample ID: 1605SWMDS034-U, F Sample Time:

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1300		
Water Temperature (°C)	17.5 °C		
Specific Conductivity (µS/cm) @ 25° C	1040		
Conductivity (µS/cm)	891		
TDS (g/L)	TO		
Dissolved Oxygen (% sat.)	36.7		
Dissolved Oxygen (mg/L)	3.46		
pH	7.54		
ORP (mV)	23.0		
Turbidity (FTU)	0.55		
Air Temperature (°F)	53 °F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/12/16 Time 13:05

Station Number MDS034

Completed by: TJ BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	13.8	0.7
2	16.3	0.7
3	14.5	0.65

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
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	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16 Arrival Time 15:10

Field Personnel

TD BJ EY Signatures [Signature]

SITE DESCRIPTION

Station Name Holmgren Spring Station Number MSG04

Latitude N on file Longitude W on file

Elevation on file ft Datum NAD 27 Photo Number

Site & Stream Description Marshy spring with lots of fallen trees and debris

Surface Water Characteristics (color, odor, appearance): Brownish tint, clear, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream) Across-stream

Sample ID: 1605SWMSG004 - U.F Sample Time: 15:15

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	15:15	TD	
Water Temperature (°C)	8.8°C		
Specific Conductivity (µS/cm) @ 25° C	648.6		
Conductivity (µS/cm)	447.3		
TDS (g/L)	TD		
Dissolved Oxygen (% sat.)	105.5		
Dissolved Oxygen (mg/L)	11.92		
pH	8.12		
ORP (mV)	17.6		
Turbidity (FTU)	3.92		
Air Temperature (°F)	35°F		TD

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16

Time 15:15

Station Number MSG 004

Completed by: TO, EY, BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
No	Flow	→ TO

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

No flow large seeping marsh No discernable flow direction

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program - Spring 2016 SW Sampling

Date 5/10/16 Arrival Time 15:40

Field Personnel

TD, BJ, EY Signatures [Signature]

SITE DESCRIPTION

Station Name Cattle Spring Station Number MSG005

Latitude N as file Longitude W as file

Elevation as file ft Datum NAD 27 Photo Number 9

Site & Stream Description water coming out of piped spring into calf trough

Surface Water Characteristics (color, odor, appearance): clear water, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle (Horizontal-bottle, Swing-sampler, Other(Up-stream / Across-stream

Sample ID: 1605 SWMSG005-U, F + MS/MGP Sample Time: 15:45

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	15:45	15:50	15:55
Water Temperature (°C)	7.1	7.1	7.0
Specific Conductivity (µS/cm) @ 25° C	675.5	673.3	671.6
Conductivity (µS/cm)	444.5	442.2	441.1
TDS (g/L)			70
Dissolved Oxygen (% sat.)	72.0	66.0	62.5
Dissolved Oxygen (mg/L)	8.45	7.87	7.51
pH	7.45	7.86	7.79
ORP (mV)	18.6	19.8	20.9
Turbidity (FTU)	0.19	0.20	0.16
Air Temperature (°C)	35° F	35° F	35° F

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16 Time 1345 Station Number MSG005

Completed by: TD BU Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	2.90	3.5
2	3.25	3.5
3	3.40	4.0

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16 Arrival Time 10:20

Field Personnel

TO BJ Signatures [Signature]

SITE DESCRIPTION

Station Name Southeast Spring Station Number MSG006

Latitude N on file Longitude W on file

Elevation on file ft Datum NAD 27 Photo Number 11

Site & Stream Description Seep coming out of side of hill below road next to willows. Cow path cutting across top of spring

Surface Water Characteristics (color, odor, appearance): Clear, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream / Across-stream)

Sample ID: 1605 SW MSG006 - U, F Sample Time: 10:25

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	10:25		
Water Temperature (°C)	7.2°C		
Specific Conductivity (µS/cm) @ 25° C	1708		
Conductivity (µS/cm)	1125		
TDS (g/L)	TO		
Dissolved Oxygen (% sat.)	65.9		
Dissolved Oxygen (mg/L)	7.91		
pH	7.50		
ORP (mV)	12.8		
Turbidity (FTU) NTU	0.90 NTU		
Air Temperature (°C) °F	43° F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16

Time 10:25

Station Number MS6006

Completed by: TO BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement <u>0.2</u> <u>0.6</u> <u>0.8</u> (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement <u>0.2</u> <u>0.6</u> <u>0.8</u> (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

No flow, seep out of hill side ~30' wide with
No measurable flows

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16 Arrival Time 10:00

Field Personnel

TD BS

Signatures

[Signature]

SITE DESCRIPTION

Station Name South of South east Spring Station Number MSG007

Latitude N ° 00 ' File " Longitude W ° 00 ' File "

Elevation on File ft Datum NAD 27 Photo Number

Site & Stream Description Spring coming out of the base of hill side ~ 20' wide no sage brush on spring

Surface Water Characteristics (color, odor, appearance): Brown color, moderate organic odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: 1605SWMSG007-U, F Sample Time: 10:05

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	10:05	/	
Water Temperature (°C)	6.3°C		
Specific Conductivity (µS/cm) @ 25° C	634.3		
Conductivity (µS/cm)	408.2		
TDS (g/L)	<u> </u> <u>TD</u>		
Dissolved Oxygen (% sat.)	27.8		
Dissolved Oxygen (mg/L)	3.4		
pH	8.00		
ORP (mV)	5.6		
Turbidity (FTU)	0.70		<u>TD</u>
Air Temperature (°C)	43°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16

Time 10:00

Station Number MSG007

Completed by: TO, BS

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

No Flow, Spring is seeping out of hillside approx 20' wide through tall ~~tussocks~~ of grass "hummocky"

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/19/16 Arrival Time 15:05

Field Personnel

T. Osburn B. Jones
E. Yenger

Signatures

[Signature]
[Signature]

SITE DESCRIPTION

Station Name Blackfoot River below Ballard Creek Station Number MS-T019

Latitude N ° ON file " Longitude W ° ON file "

Elevation ON file ft Datum NAD 27 Photo Number _____

Site & Stream Description ~30 ft wide stream topping bank
water flowing through grasses + shrubs

Surface Water Characteristics (color, odor, appearance): cloudy high river
odorless, stream topping the banks

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream) Across-stream

Sample ID: 1605SWIMST019-U, F Sample Time: 1505

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	15:05		
Water Temperature (°C)	12.5°C		
Specific Conductivity (µS/cm) @ 25° C	329.7		
Conductivity (µS/cm)	251.3		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	94%		
Dissolved Oxygen (mg/L)	8.0		
pH	7.48		
ORP (mV)	107.7		
Turbidity (FTU)	13.5		
Air Temperature (°C) F	53°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 05 / 09 / 2016

Time 15:05

Station Number MST019

Completed by: B. Jones / T. Osburn / E. Yeager Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement <u>0.2</u> <u>0.6</u> <u>0.8</u> (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement <u>0.2</u> <u>0.6</u> <u>0.8</u> (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Sample collected near USGS station; Staff gage covered; flows too high to wade in river

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16 Arrival Time 13:30

Field Personnel

To, BJ Signatures [Signature]

SITE DESCRIPTION

Station Name Blackfoot River below State Road Creek Station Number MST020

Latitude N on file Longitude W on file

Elevation on file ft Datum NAD 27 Photo Number

Site & Stream Description water very high almost topping over the banks of the stream

Surface Water Characteristics (color, odor, appearance): odorless brown

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other() Up-stream / Across-stream

Sample ID: 1605 SW MST020-UF Sample Time: 13:35

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	13:35	TO	
Water Temperature (°C)	8.4°C		
Specific Conductivity (µS/cm) @ 25° C	454.7		
Conductivity (µS/cm)	310.2		
TDS (g/L)	TO		
Dissolved Oxygen (% sat.)	82.2%		
Dissolved Oxygen (mg/L)	9.66		
pH	8.27		
ORP (mV)	22.3		
Turbidity (FTU) NTU	19.6 NTU		
Air Temperature (°C) °F	43°F		TO

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5 / 11 / 16

Time 13:40

Station Number MST020

Completed by: JO, BY

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Stream flow too high to safely enter, will use USGS stream gauge that is stationed down stream

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/12/16 Arrival Time 11:55

Field Personnel

T. Osborn Signatures [Signature]
B. Jones _____

SITE DESCRIPTION

Station Name Immediately below Henry Mine (917 #24) Station Number MST044

Latitude N 0° 00' 00" N Longitude W 111° 00' 00" W

Elevation on file ft Datum NAD 27 Photo Number _____

Site & Stream Description Clear stream ~ 10' wide winding through short Basalt cliff band (~ 2-10' tall) sweeping/meandering banks in stream

Surface Water Characteristics (color, odor, appearance): Clear, odorless
some small bubbles (white) on surface

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream) Across-stream

Sample ID: 16055WMST044-U, F Sample Time: 12:05

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	12:05		
Water Temperature (°C)	13.5°C		
Specific Conductivity (µS/cm) @ 25° C	699		
Conductivity (µS/cm)	545		
TDS (g/L)	_____		
Dissolved Oxygen (% sat.)	95.7		
Dissolved Oxygen (mg/L)	9.98		
pH	8.17		
ORP (mV)	38.6		
Turbidity (FTU)	1.33		
Air Temperature (°F)	53°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/12/16

Time 1220

Station Number WST044

Completed by: TD, BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 10.0 ft L.E.W. 1.0 ft Total Width 21.8 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
1.0	1	0.3	-0.11	8.5	16	0.7	0.21
1.5	2	1.1	0.78	9.0	17	0.3	0.15
2.0	3	1.1	2.77	9.5	18	0.2	0.12
2.5	4	1.2	3.54	10.0	19	NA	NA
3.0	5	1.3	1.82				
3.5	6	1.2	0.17				
4.0	7	1.3	2.3				
4.5	8	1.1	2.61				
5.0	9	0.9	2.73				
5.5	10	0.9	1.98				
6.0	11	0.9	1.91				
6.5	12	0.9	1.33				
7.0	13	0.8	0.90				
7.5	14	0.8	0.66				
8.0	15	0.8	0.38				

→ No Flow

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/12/16 Arrival Time 10:35

Field Personnel

T. Osborn

Signatures

[Signature]

B. Jones

SITE DESCRIPTION

Station Name Little Blackfoot River above Henry Creek Station Number MST045

Latitude N 00 00 00 Longitude W 00 00 00

Elevation on file ft Datum NAD 27 Photo Number

Site & Stream Description 10 ft wide stream w/ 30 ft. wide overbank in 100 ft. wide ravine; flat gravel stream bottom

Surface Water Characteristics (color, odor, appearance): clear; no odor; some organic matter on stream banks.

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other() Up-stream / Across-stream

Sample ID: 16055WMS045 - U, F + duplicate Sample Time: 1100

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	<u>1100</u>	<u>1105</u>	
Water Temperature (°C)	<u>11.6</u>	<u>11.6</u>	
Specific Conductivity (µS/cm) @ 25° C	<u>693</u>	<u>693</u>	
Conductivity (µS/cm)	<u>515</u>	<u>516</u>	
TDS (g/L)	<u>70</u>	<u>70</u>	
Dissolved Oxygen (% sat.)	<u>89.0</u>	<u>89.1</u>	
Dissolved Oxygen (mg/L)	<u>9.62</u>	<u>9.68</u>	
pH	<u>8.02</u>	<u>8.02</u>	
ORP (mV)	<u>38.7</u>	<u>38.2</u>	
Turbidity (FTU)	<u>1.08</u>	<u>1.40</u>	
Air Temperature (°C) °F	<u>53°F</u>	<u>53°F</u>	

TO

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5 / 12 / 2016 Time 11:15

Station Number MST045

Completed by: B. Jones / T. Osborn Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 21.45 ft L.E.W. 31.0 ft Total Width 36.2 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface) TD/2 (on staff) TD x 2 (on staff)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD x 2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
21.5	1	1.15	0.60	29.0	16	1.0	0.26
22.0	2	1.20	0.83	29.5	17	0.9	0.14
22.5	3	1.20	1.05	30.0	18	0.9	0.88
23.0	4	1.20	0.95	30.5	19	0.9	0.18
23.5	5	1.25	1.24	31.0	20	NA	NA
24.0	6	1.30	1.20				
24.5	7	1.30	1.26				
25.0	8	1.30	1.30				
25.5	9	1.35	1.24				
26.0	10	1.3	1.31				
26.5	11	1.3	1.31				
27.0	12	1.2	1.25				
27.5	13	1.2	0.8				
28.0	14	1.1	1.00				
28.5	15	1.1	0.69				

→ No Flow

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/9/16 Arrival Time 17:41

Field Personnel

T. Osborn B. Jones Signatures [Signature]
E. Younger

SITE DESCRIPTION

Station Name Long Valley Creek below Ballad Mine Station Number MST050

Latitude N ON file " Longitude W ON file "

Elevation ON file ft Datum NAD 27 Photo Number 2

Site & Stream Description stream flow north of catchment pond

large frog population

Surface Water Characteristics (color, odor, appearance): Yellowish green, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: 1605 SW MST 050-U, F Sample Time: _____

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	17:50	To	
Water Temperature (°C)	16.1		
Specific Conductivity (µS/cm) @ 25° C	280.9 ^{µS} /cm		
Conductivity (µS/cm)	233.0 ^{µS} /cm		
TDS (g/L)	— T8		
Dissolved Oxygen (% sat.)	103.2 %		
Dissolved Oxygen (mg/L)	8.10 ^{mg} /L		
pH	7.99		
ORP (mV)	131.9 mV		
Turbidity (FTU)	3.02 NTU		
Air Temperature (°C) ^{°F}	49° F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16

Time 08:40

Station Number M5T050

Completed by: BT, TD, EY

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.49	9.25
2	1.55	9.5
3	1.48	9.75

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

TD

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program - Spring 2016 SW Sampling

Date 5/12/16 Arrival Time 1355

Field Personnel

T. Osborn

Signatures

[Signature]

B. Jones

SITE DESCRIPTION

Station Name East Fork Long Valley Creek
Below Henry mine

Station Number MST051

Latitude N 0° 0' N file Longitude W 0° 0' W file

Elevation on file ft Datum NAD 27 Photo Number

Site & Stream Description DRY

Surface Water Characteristics (color, odor, appearance): DRY

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other() Up-stream / Across-stream

Sample ID: 1605 SWMST051-U, F Sample Time:

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)	<u>61° F</u>		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/12/16 Time 1355

Station Number MST051

Completed by: TO, BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16 Arrival Time 17:10

Field Personnel

To, BJ Signatures [Signature]

SITE DESCRIPTION

Station Name West Fork Lone Pine Creek Above Lone Pine Creek Station Number MST057

Latitude N ° on 'file' Longitude W ° on 'file'

Elevation on file ft Datum NAD 27 Photo Number

Site & Stream Description small stream channel that has flooded over its banks and put ~1-2" of water in the surrounding field

Surface Water Characteristics (color, odor, appearance): clear, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other() Up-stream Across-stream

Sample ID: 1605 SW MST057-U, F Sample Time: 17:15

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	17:15	/	
Water Temperature (°C)	16.7°C		
Specific Conductivity (µS/cm) @ 25° C	412.8		
Conductivity (µS/cm)	347.2		
TDS (g/L)	90		
Dissolved Oxygen (% sat.)	73.0		
Dissolved Oxygen (mg/L)	7.10		
pH	8.04		
ORP (mV)	11.5		
Turbidity (FTU)	0.98		7.0
Air Temperature (°C) °F	51°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16

Time 17:10

Station Number MST057

Completed by: TD, BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

No Flow, Flooded Field with stream overtopping banks

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5 / 11 / 16 Arrival Time 1600

Field Personnel

TD, BT Signatures [Signature]

SITE DESCRIPTION

Station Name Shipmine creek Below Heavy Mine Station Number MST063

Latitude N ° on File Longitude W ° on File

Elevation on File ft Datum NAD 27 Photo Number

Site & Stream Description mossy swamp area next to road

Surface Water Characteristics (color, odor, appearance): clear with oily sheen, mossy, light organic odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream) Across-stream

Sample ID: 1605SWMST063 - U, F Sample Time: 1620

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1620		
Water Temperature (°C)	12.6		
Specific Conductivity (µS/cm) @ 25° C	649.5		
Conductivity (µS/cm)	445.5		
TDS (g/L)	TO		
Dissolved Oxygen (% sat.)	3.8		
Dissolved Oxygen (mg/L)	0.43		
pH	7.60		
ORP (mV)	-19.7		
Turbidity (FTU)	14.2 NTU		
Air Temperature (°F)	51° F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16

Time 1600

Station Number MST063

Completed by: TD, BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

No flow, Swamp area

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16 Arrival Time 14:20

Field Personnel

TO BJ Signatures [Signature]

SITE DESCRIPTION

Station Name Ballant Creek above Blackfoot River Station Number MST066

Latitude N ° 00 ' 00 " Longitude W ° 00 ' 00 "

Elevation on file ft Datum NAD 27 Photo Number _____

Site & Stream Description stream flowing through grassy ravine with tussocks

Surface Water Characteristics (color, odor, appearance): Clear to colorless, light greenish brown tint, faint organic odor

SAMPLE COLLECTION

Collection Method: 1L bottle Horizontal-bottle Swing-sampler Other(Up-stream / Across-stream)

Sample ID: 1605SWMST066-U, F Sample Time: 14:25

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	14:25		
Water Temperature (°C)	18.1°C		
Specific Conductivity (µS/cm) @ 25° C	581		
Conductivity (µS/cm)	504		
TDS (g/L)	TO		
Dissolved Oxygen (% sat.)	111.3		
Dissolved Oxygen (mg/L)	10.54		
pH	8.33		
ORP (mV)	27.5		
Turbidity (FTU)	1.07		
Air Temperature (°C) °F	43°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program - Spring 2016 SW Sampling

Date 5/11/16

Time 14:40

Station Number MS1066

Completed by: JO. BS

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 9.8 ft L.E.W. 1.8 ft Total Width 13.8 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement			Distance from Reference (or N/A)	Depth of Velocity Measurement		
	0.2	0.6	0.8 (circle)		0.2	0.6	0.8 (circle)
Subsection No.	Subsection Depth (ft)	Velocity (30 sec)	Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)	Subsection No. (or N/A)	Subsection Depth (ft)
1.8	1	0.2	-0.1				
2.3	2	0.2	-0.05				
2.8	3	0	NA				
3.3	4	0					
3.8	5	0					
4.3	6	0.4	0.04				
4.8	7	0.3	0.03				
5.3	8	0.4	0.07				
5.8	9	0.4	0.18				
6.3	10	0.5	0.11				
6.8	11	0.5	-0.04				
7.3	12	0	NA				
7.8	13	0					
8.3	14	0					
8.8	15	0.2	-0.10				

9.3 0.2 -0.10

9.8

Grass tussock in stream - no flow possible - 37
 Grass tussock in middle of stream (flow not possible) 63

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5 / 11 / 16 Arrival Time 1530

Field Personnel

To, BJ Signatures [Signature]

SITE DESCRIPTION

Station Name Ballard Creek Headwaters Station Number MST067

Latitude N ° ON file " Longitude W ° ON file "

Elevation ON file ft Datum NAD 27 Photo Number

Site & Stream Description Small stream cutting through grassy field

Surface Water Characteristics (color, odor, appearance): clear with light organic odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other() Up-stream / Across-stream

Sample ID: 1605SWMST067-U1F Sample Time: 15:35

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	15:35	↘	
Water Temperature (°C)	8.3°C		
Specific Conductivity (µS/cm) @ 25° C	2354		
Conductivity (µS/cm)	1602		
TDS (g/L)	———— Tb		
Dissolved Oxygen (% sat.)	60.8		
Dissolved Oxygen (mg/L)	7.05		
pH	8.10		
ORP (mV)	42.0		Tb
Turbidity (NTU)	7.22		
Air Temperature (°C) • F	43°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16 Time 15:40

Station Number MST067

Completed by: TD, BT

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
<u>1</u>	<u>3.01</u>	<u>1.75</u>
<u>2</u>	<u>3.65</u>	<u>2.20</u>
<u>3</u>	<u>3.08</u>	<u>2.00</u>

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<u><2</u>	<u>8 - 10</u>	<u>0.2 - 0.3</u>
<u>2 - 4</u>	<u>10 - 12</u>	<u>0.3 - 0.4</u>
<u>4 - 10</u>	<u>12 - 15</u>	<u>0.4 - 0.7</u>
<u>10 - 20</u>	<u>15 - 20</u>	<u>0.7 - 1.0</u>
<u>>20</u>	<u>20 - 25</u>	<u>1.0 - 2.0</u>

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement <u>0.2</u> <u>0.6</u> <u>0.8</u> (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement <u>0.2</u> <u>0.6</u> <u>0.8</u> (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

TD

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16 Arrival Time 11:57

Field Personnel

TO, BJ

Signatures

[Signature]

SITE DESCRIPTION

Station Name Short Creek Below Ballard Mine Station Number MST069

Latitude N 0° 00' 00" N Longitude W 0° 00' 00" W

Elevation on file Datum NAD 27 Photo Number

Site & Stream Description stream with shallow rocky bottom
coming out of the top of waste rock pile

Surface Water Characteristics (color, odor, appearance): clear, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle Horizontal-bottle, Swing-sampler, Other() Up-stream / Across-stream

Sample ID: 16058WMST069-U, F Sample Time: 12:15

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	12:15		
Water Temperature (°C)	10.4 °C		
Specific Conductivity (µS/cm) @ 25° C	1563		
Conductivity (µS/cm)	1129		
TDS (g/L)	TO		
Dissolved Oxygen (% sat.)	72.3		
Dissolved Oxygen (mg/L)	8.03		
pH	7.51		
ORP (mV)	44.7		
Turbidity (FTU)	4.25 NTU 0.36 NTU		
Air Temperature (°F)	43° F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 8/11/16

Time 12:28

Station Number MST069

Completed by: TO, BT

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
<u>1</u>	<u>4.51</u>	<u>2.75</u>
<u>2</u>	<u>4.40</u>	<u>2.50</u>
<u>3</u>	<u>4.11</u>	<u>3.00</u>

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement			Distance from Reference (or N/A)	Depth of Velocity Measurement		
	0.2	0.6	0.8 (circle)		0.2	0.6	0.8 (circle)
Subsection No.	Subsection Depth (ft)	Velocity (30 sec)	Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)	Subsection No. (or N/A)	Subsection Depth (ft)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

TO

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16 Arrival Time 12:09

Field Personnel

TO BJ Signatures [Signature]
EY

SITE DESCRIPTION

Station Name Woolley Valley Creek, below North Fork Woolley Valley Creek Station Number MST089

Latitude N 0° 00' 00" E Longitude W 111° 00' 00" S

Elevation on file ft Datum NAD 27 Photo Number 5

Site & Stream Description meandering stream cutting through grassy meadows

Surface Water Characteristics (color, odor, appearance): clear, no odor, slight green-brown color

SAMPLE COLLECTION

Collection Method: 1L bottle Horizontal-bottle Swing-sampler Other(X Up-stream / Across-stream

Sample ID: 1605 SW MST089 - U, F + MS/MSD Sample Time: 12:18

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	12:18	12:22	12:26
Water Temperature (°C)	8.9°C	8.9°C	9.0°C
Specific Conductivity (µS/cm) @ 25° C	456.6	455.6	455.1
Conductivity (µS/cm)	316.3	315.9	315.8
TDS (g/L)			T ₀
Dissolved Oxygen (% sat.)	88.3	86.0	85.5
Dissolved Oxygen (mg/L)	10.21	9.84	9.80
pH	7.88	7.85	7.82
ORP (mV)	17.2	18.1	19.3
Turbidity (FTU)	1.19	0.87	0.99
Air Temperature (°C)	35°F	35°F	35°F

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16

Time 12

Station Number MST089

Completed by: TD, BJ, EY

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 14.6 ft L.E.W. 3.7 ft Total Width 15.5 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
3.7	1	No Flow		14.2	No Flow		
4.4	2	0.2	0.01	14.9	No Flow		
5.1	3	0.5	0.03				
5.8	4	0.6	0.07				
6.5	5	0.8	0.17				
7.2	6	1.1	0.11				
7.9	7	1.4	0.07				
8.6	8	1.2	0.11				
9.3	9	1.1	0.02				
10.0	10	0.8	0.04				
10.7	11	0.7	0.00				
11.4	12	0.7	0.01				
12.1	13	0.5	-0.02				
12.8	14	0.3	-0.01				
13.5	15	0.2	-0.01				

SURFACE WATER SAMPLE COLLECTION FORM

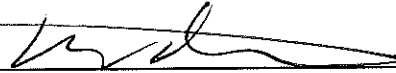
Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5 / 10 / 16 Arrival Time 13:40

Field Personnel

TO, EY, BJ

Signatures



SITE DESCRIPTION

Station Name Wooley Valley Creek above North Fork Wooley Valley Creek Station Number MST090

Latitude N ° ON FILE Longitude W ° ON FILE

Elevation ON FILE ft Datum NAD 27 Photo Number 6

Site & Stream Description meandering stream through grassy field
grass in stream

Surface Water Characteristics (color, odor, appearance): clear odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: 1605 SWMST090 - U, F Sample Time: 13:45

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	13:45		
Water Temperature (°C)	9.4		
Specific Conductivity (µS/cm) @ 25° C	394.0		
Conductivity (µS/cm)	276.9		
TDS (g/L)	— To		
Dissolved Oxygen (% sat.)	84.6 %		
Dissolved Oxygen (mg/L)	9.52		
pH	7.91		
ORP (mV)	16.3		
Turbidity (FTU) NTU	0.55 NTU		
Air Temperature (°C) °F	35° F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5 / 10 / 16

Time 13:40

Station Number MST090

Completed by: TO, EY, BS

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 3.1 ft L.E.W. 0.1 ft Total Width 4.5 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.1	1	No Flow					
0.5	2	0.3	0.13				
0.9	3	0.4	0.12				
1.3	4	0.5	0.07				
1.7	5	1.1	1.64				
2.1	6	1.2	0.59				
2.5	7	0.2	0.11				
2.9	8	0.3	0.12				
3.3	9	0.3	0.25				
3.7	10	0.3	0.18				
3.9	11	0.2	0.20				
4.1	12	No Flow					
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16 Arrival Time 11:00

Field Personnel

TO, BJ
EY

Signatures

[Signature]

SITE DESCRIPTION

Station Name North Fork Woolley Valley Creek
above Woolley Valley Creek Station Number MST092

Latitude N ° 00' 00" N Longitude W ° 00' 00" W

Elevation 2000 ft Datum NAD 27 Photo Number 4

Site & Stream Description nearby stream through tall grass
with cow manure in surrounding fields

Surface Water Characteristics (color, odor, appearance): Clear, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(), Up-stream / Across-stream

Sample ID: 1605SWMST092-U, F Sample Time: 11:00

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	11:00	To	
Water Temperature (°C)	7.3°C		
Specific Conductivity (µS/cm) @ 25° C	564.1		
Conductivity (µS/cm)	373.4		
TDS (g/L)	— To		
Dissolved Oxygen (% sat.)	59.8		
Dissolved Oxygen (mg/L)	7.15		
pH	7.62		
ORP (mV)	-74.0		
Turbidity (NTU)	1.38 NTU		
Air Temperature (°F)	35°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5 / 10 / 16

Time 11:13

Station Number MST092

Completed by: TO, EY, BS

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 0.1 ft L.E.W. 9.6 ft Total Width 10.5 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement <u>0.2</u> <u>0.6</u> <u>0.8</u> (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement <u>0.2</u> <u>0.6</u> <u>0.8</u> (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.1	1	0.2	0.02				
0.8	2	0.4	0.01				
1.5	3	0.5	0.04				
2.2	4	0.6	0.01				
2.9	5	0.5	0.03				
3.6	6	0.6	0.01				
4.3	7	0.7	0.12				
5.0	8	0.7	0.35				
5.7	9	0.75	0.08				
6.4	10	0.6	0.03				
7.1	11	0.5	0.18				
7.8	12	0.3	0.01				
8.5	13	0.1	~ 0.01				
9.2	14	0.2	.01				
9.96	15						

BS - No Flow @ 9.6

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16 Arrival Time 16:20

Field Personnel

TD, BJ, EY Signatures [Signature]

SITE DESCRIPTION

Station Name Spring Fork Trib #1 of N Fork Wasley Valley Cr. below Bullhead mine Station Number MST094
 Latitude N on file Longitude W on file
 Elevation on file ft Datum NAD 27 Photo Number 10
 Site & Stream Description stream flows under road through culvert

Surface Water Characteristics (color, odor, appearance): clear water, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle Horizontal-bottle Swing-sampler Other() Up-stream Across-stream

Sample ID: 1605SW MST094 - U, F Sample Time: 16:27

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	16:27		
Water Temperature (°C)	11.0°C		
Specific Conductivity (µS/cm) @ 25° C	330.0		
Conductivity (µS/cm)	241.6		
TDS (g/L)	<u>TD</u>		
Dissolved Oxygen (% sat.)	74.3		
Dissolved Oxygen (mg/L)	8.05		
pH	7.84		
ORP (mV)	20.0		
Turbidity (FTU)	0.65 NTU		
Air Temperature (°C)	35°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16 Time 1430 Station Number MST094

Completed by: TO BO Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.8	2.0
2	1.81	2.0
3	2.08	2.25

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16 Arrival Time 11:10

Field Personnel

TO, BJ Signatures [Signature]

SITE DESCRIPTION

Station Name Spring-fed Trib. #2 of N. Fork Wadley Valley Creek, below Ballard Mine Station Number MST095

Latitude N on file Longitude W on file

Elevation on file ft Datum NAD 27 Photo Number

Site & Stream Description small stream with grassy banks
low maneuver in stream bed

Surface Water Characteristics (color, odor, appearance): clear, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream) Across-stream

Sample ID: 1605 SW MST095-U, F Sample Time: 11:20

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	11:20	/	
Water Temperature (°C)	11.8°C		
Specific Conductivity (µS/cm) @ 25° C	945		
Conductivity (µS/cm)	707		
TDS (g/L)	— 70		
Dissolved Oxygen (% sat.)	77.0		
Dissolved Oxygen (mg/L)	8.15		
pH	7.88		
ORP (mV)	17.7		
Turbidity (FTU)	0.39		
Air Temperature (°C)	43°C		70

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/11/16

Time 11:30

Station Number MST095

Completed by: TO, BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.40	5.5L
2	1.81	6.0L
3	1.58	5.5L

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

TO

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16 Arrival Time 14:35

Field Personnel

TO, EY, BJ Signatures [Signature]

SITE DESCRIPTION

Station Name Tributary of North Fork Woolly Valley Creek, below Ballard mine Station Number MST096
 Latitude N 0 on file Longitude W 0 on file
 Elevation on file ft Datum NAD 27 Photo Number

Site & Stream Description stream with grass to wide and shallow with small channels within

Surface Water Characteristics (color, odor, appearance): Manure odor, clear

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: 1605 SW MST096 - U, F Sample Time: 14:40

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	14:40		
Water Temperature (°C)	13.2		
Specific Conductivity (µS/cm) @ 25° C	664		
Conductivity (µS/cm)	514		
TDS (g/L)	TO		
Dissolved Oxygen (% sat.)	108.7		
Dissolved Oxygen (mg/L)	11.29		
pH	8.38		
ORP (mV)	10.8		
Turbidity (FTU)	2.28		
Air Temperature (°C)	35° F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/10/16 Time 14:35 Station Number MST-96

Completed by: TO, BT, EY Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	2.0	3.0
2	1.01	3.5
3	2.05	3.75

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft *EW*

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/13/16 Arrival Time 10:15

Field Personnel

T. Osborn

Signatures

[Signature]

B. Jones

SITE DESCRIPTION

Station Name Angus Creek above Reservoir Station Number MST128

Latitude N • on "Fire" Longitude W • on "R"

Elevation on "R" ft Datum NAD 27 Photo Number

Site & Stream Description Bedrock stream cutting through willows and grass

Surface Water Characteristics (color, odor, appearance): clear water odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream / Across-stream)

Sample ID: 16055WPMST128-U, F Sample Time: 10:20

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	10:20	/	
Water Temperature (°C)	9.7°C		
Specific Conductivity (µS/cm) @ 25° C	446 µS/cm		
Conductivity (µS/cm)	315.6		
TDS (g/L)	<u>70</u>		
Dissolved Oxygen (% sat.)	81.8%		
Dissolved Oxygen (mg/L)	9.15		
pH	8.00		
ORP (mV)	41.3		
Turbidity (FTU) NTU	4.50 NTU		
Air Temperature (°C)	50°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/13/16

Time 1030

Station Number MST 128

Completed by: TD, BT

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 8.5 ft L.E.W. 1.0 ft Total Width 13.9 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
1.0	1	0.3	-0.21	8.5	0.1 16	0.2 3	0.23
1.5	2	0.7	0.11				
2.0	3	1.1	-0.11				
2.5	4	1.0 1.2	1.0 1.2				
3.0	5	1.1	1.53				
3.5	6	1.1	2.22				
4.0	7	1.1	2.65				
4.5	8	1.1	2.9				
5.0	9	1.1	2.35				
5.5	10	0.9	1.85				
6.0	11	0.7	1.51				
6.5	12	0.5	0.81				
7.0	13	0.4	0.64				
7.5	14	0.25	0.33				
8.0	15	0.2	0.32				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/13/16 Arrival Time 9:45

Field Personnel

T. Osborn Signatures [Signature]
B. Jones

SITE DESCRIPTION

Station Name Rasmussen Creek above Angus Creek Station Number MST131

Latitude N 0° 05' 12" E Longitude W 108° 05' 12" E

Elevation on file ft Datum NAD 27 Photo Number _____

Site & Stream Description meandering stream through grassy field above confluence to the North east

Surface Water Characteristics (color, odor, appearance): silty colorless

SAMPLE COLLECTION

Collection Method: 1L bottle Horizontal-bottle Swing-sampler Other() Up-stream Across-stream

Sample ID: 1605SWMST131-U, F Sample Time: 0950

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	0950	/	
Water Temperature (°C)	7.5		
Specific Conductivity (µS/cm) @ 25° C	311.3		
Conductivity (µS/cm)	266.0		
TDS (g/L)	70		
Dissolved Oxygen (% sat.)	80.4%		
Dissolved Oxygen (mg/L)	9.55		
pH	7.99		
ORP (mV)	46.7		
Turbidity (NTU)	10.1 NTU		
Air Temperature (°F)	50°F		16

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 05/13/16

Time 0950

Station Number MST131

Completed by: TO, RJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 8.1 ft L.E.W. 3.7 ft Total Width 13.3 ft

Number of Subsections Based on Stream Width

Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
3.7	1	0.2	-0.09				
4.1	2	0.3	-0.03				
4.5	3	0.3	0.15				
4.9	4	0.1	0.01				
5.3	5	NA	NA				
5.7	6	0.2	0.02				
6.1	7	1.0	0.88				
6.5	8	1.2	1.11				
6.9	9	1.2	1.03				
7.3	10	0.8	0.44				
7.7	11	0.6	-0.03				
8.1	12	0.1	NA				
8.5	13	NA	NA				
8.9	14	NA	NA				
	15						

No Flow
(BS)

No Flow
(BS)



SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/13/16 Arrival Time 0910

Field Personnel

T. Osborn Signatures [Signature]
B. Jones

SITE DESCRIPTION

Station Name Angus Creek Above No Name Creek Below Russussen Creek Station Number MST 132
 Latitude N 0N 42" Longitude W 0N 42"
 Elevation on file ft Datum NAD 27 Photo Number _____
 Site & Stream Description Meandering stream cutting through grassy meadow with willows
 Surface Water Characteristics (color, odor, appearance): silty, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream) Across-stream
 Sample ID: 1605 SW MST 132 - 1, 2 - U, F Sample Time: 0915

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	0915	0920	
Water Temperature (°C)	7.8°C	7.8°C	
Specific Conductivity (µS/cm) @ 25° C	309.0	308.0	
Conductivity (µS/cm)	205.8	203.7	
TDS (g/L)		70	
Dissolved Oxygen (% sat.)	79.5	79.6	
Dissolved Oxygen (mg/L)	9.33	9.33	
pH	7.85	7.85	
ORP (mV)	55.0	54.6	
Turbidity (FTU) NTU	5.91 NTU	5.63 NTU	
Air Temperature (°F)	50°F	50°F	

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/13/16

Time 0930

Station Number MST132

Completed by: TO, RJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter TO

R.E.W. 17.8 ft

L.E.W. 14.8 ft

Total Width 24.7 ft

Number of Subsections Based on Stream Width

Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
13.8	1	1.5	0.34				
14.2	2	1.5	0.88				
14.6	3	1.5	1.22				
15.0	4	1.6	1.22				
15.4	5	1.6	1.23				
15.8	6	1.6	1.51				
16.2	7	1.6	1.46				
16.6	8	0.9	1.51				
17.0	9	0.9	1.22				
17.4	10	0.9	1.00				
17.8	11	1.0	0.54				
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program - Spring 2016 SW Sampling

Date 5/13/16 Arrival Time 13:20

Field Personnel

T. Osborn

Signatures

[Signature]

B. Jones

SITE DESCRIPTION

Station Name Rasmussen Creek below Enoch Valley Mine Station Number MST133

Latitude N ON File Longitude W ON File

Elevation ON File ft Datum NAD 27 Photo Number

Site & Stream Description meandering stream north of road cutting through tall grass

Surface Water Characteristics (color, odor, appearance): light Brown tint
odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: 1605SWMST133 Sample Time: 1325

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1325		
Water Temperature (°C)	18.6		
Specific Conductivity (µS/cm) @ 25° C	299.9		
Conductivity (µS/cm)	263.3		
TDS (g/L)	TO		
Dissolved Oxygen (% sat.)	84.5		
Dissolved Oxygen (mg/L)	7.77		
pH	7.88		
ORP (mV)	26.5		
Turbidity (NTU)	16.2 NTU		
Air Temperature (°F)	50		TO

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5 / 13 / 16 Time 13:40

Station Number MST133

Completed by: TO, BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 6.5 ft L.E.W. 1.3 ft Total Width 7.0 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
1.3	1	No Flow					
1.7	2	0.1	0.23				
2.1	3	0.3	0.26				
2.5	4	0.4	0.31				
2.9	5	0.4	0.58				
3.3	6	0.5	1.19				
3.7	7	0.6	1.07				
4.1	8	0.6	1.05				
4.5	9	0.6	1.43				
4.9	10	0.5	0.56				
5.3	11	0.4	0.77				
5.7	12	0.4	0.56				
6.1	13	0.3	0.36				
6.5	14	0.3	0.30				
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/12/16 Arrival Time 14:40

Field Personnel

T. Aborn

Signatures

B. Jones

SITE DESCRIPTION

Station Name Rasmussen Creek headwaters near Enock Valley Mine Shop Road Station Number MST136

Latitude N on file Longitude W on file

Elevation on file ft Datum NAD 27 Photo Number _____

Site & Stream Description meandering stream with standing water
NO flow, grassy

Surface Water Characteristics (color, odor, appearance): clear, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: 1605SWMST136 - U, F Sample Time: 14:45

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	<u>14:45</u>		
Water Temperature (°C)	<u>18.3°C</u>		
Specific Conductivity (µS/cm) @ 25° C	<u>391.6</u>		
Conductivity (µS/cm)	<u>343.3</u>		
TDS (g/L)	<u>TO</u>		
Dissolved Oxygen (% sat.)	<u>42.7</u>		
Dissolved Oxygen (mg/L)	<u>3.90</u>		
pH	<u>7.49</u>		
ORP (mV)	<u>29.4</u>		
Turbidity (NTU) <u>NTU</u>	<u>6.59 NTU</u>		
Air Temperature (°C) <u>°F</u>	<u>61°F</u>		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/12/16

Time 14:50

Station Number MST136

Completed by: TO, BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

No flow swampy stream with standing water

TD

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/13/16 Arrival Time 11:30

Field Personnel

T. Odum

Signatures

B. Jones

SITE DESCRIPTION

Station Name East fork Rasmussen Creek above Rasmussen Creek Station Number MST143

Latitude N on file Longitude W on file

Elevation on file ft Datum NAD 27 Photo Number

Site & Stream Description shallow creek meandering through grassy field, lots of cow manure

Surface Water Characteristics (color, odor, appearance): light brown silty organic odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream / Across-stream)

Sample ID: 1605 SW MST143-U, F Sample Time: 1135

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1135		
Water Temperature (°C)	11.3 °C		
Specific Conductivity (µS/cm) @ 25° C	139.6		
Conductivity (µS/cm)	103.0		
TDS (g/L)	TO		
Dissolved Oxygen (% sat.)	76.0		
Dissolved Oxygen (mg/L)	8.31		
pH	7.60		
ORP (mV)	41.8		
Turbidity (FTU) NTU	18.4 NTU		
Air Temperature (°C)	50 F		

TO

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/13/16

Time 11:46

Station Number MST143

Completed by: TO/BS

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	2.53	0.35
2	2.55	0.40
3	2.51	0.48

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

[Handwritten signature]

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/13/16 Arrival Time 1420

Field Personnel

T. Osborn

Signatures

B. Jones

SITE DESCRIPTION

Station Name West Pond Creek headwaters, below West Pond Station Number MST144

Latitude N 0 ON File Longitude W 0 ON File

Elevation ON FILE ft Datum NAD 27 Photo Number

Site & Stream Description Seep forming a small stream in Ravine

Surface Water Characteristics (color, odor, appearance): strong organic odor clear

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other() Up-stream / Across-stream

Sample ID: 1605 SWMST144-UF Sample Time: 1425

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1425		
Water Temperature (°C)	11.1°C		
Specific Conductivity (µS/cm) @ 25° C	791		
Conductivity (µS/cm)	581		
TDS (g/L)	TO		
Dissolved Oxygen (% sat.)	57.0		
Dissolved Oxygen (mg/L)	6.18		
pH	7.57		
ORP (mV)	42.7		
Turbidity (NTU)	13.4 NTU		
Air Temperature (°F)	50°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/13/16

Time 14:35

Station Number 15T 144

Completed by: TO, BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
<u>1</u>	<u>2.15</u>	<u>1.5</u>
<u>2</u>	<u>2.25</u>	<u>1.25</u>
<u>3</u>	<u>2.20</u>	<u>1.5</u>

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<u>2</u>	8 - 10	0.2 - 0.3
<u>2 - 4</u>	10 - 12	0.3 - 0.4
<u>4 - 10</u>	12 - 15	0.4 - 0.7
<u>10 - 20</u>	15 - 20	0.7 - 1.0
<u>>20</u>	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

TO

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/12/16 Arrival Time 16:30

Field Personnel

T. Osborn

Signatures

B. Jones

SITE DESCRIPTION

Station Name Tributary to Love Pine Creek Station Number MST226

Latitude N ° on file Longitude W ° on file

Elevation on file ft Datum NAD 27 Photo Number

Site & Stream Description water flowing out of small pond
Through grass & moss

Surface Water Characteristics (color, odor, appearance): Clear, ~~no~~ TO
odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: 1605SWMST226-U, F + MS/MSD Sample Time: 1650

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1650	1655	1700
Water Temperature (°C)	7.4°C	7.4°C	7.4°C
Specific Conductivity (µS/cm) @ 25° C	353.4	353.5	353.8
Conductivity (µS/cm)	235.2	234.6	234.9
TDS (g/L)			TO
Dissolved Oxygen (% sat.)	80.6	75.2	74.8
Dissolved Oxygen (mg/L)	9.44	8.94	8.84
pH	7.26	7.16	7.04
ORP (mV)	58.4	60.7	63.8
Turbidity (FTU) WTV	2.64	0.92	0.62
Air Temperature (°C) °F	63°F	63°F	63°F

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/12/16 Time 1700

Station Number WST236

Completed by: BJS, TD

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	1.58	4.5 L
2	1.48	4.5 L
3	1.48	4.5 L

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program - Spring 2016 SW Sampling

Date 5/13/16 Arrival Time 1530

Field Personnel

T. Osborn

Signatures

B. Jones

SITE DESCRIPTION

Station Name East Fork Rossman Creek
Headwaters

Station Number MST269

Latitude N on file Longitude W on file

Elevation on file ft Datum NAD 27 Photo Number _____

Site & Stream Description Dry grassy Ravine

Surface Water Characteristics (color, odor, appearance): DRY

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other() Up-stream / Across-stream

Sample ID: 1605SWMST269-U, F Sample Time: _____

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5 / 13 / 16

Time 1530

Station Number MST26A

Completed by: T. BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/13/16 Arrival Time 12:15

Field Personnel

T. Osborn

Signatures

B. Jones

SITE DESCRIPTION

Station Name West Fork of Rasmussen Creek Station Number MST 274

Latitude N on file Longitude W on file

Elevation on file ft Datum NAD 27 Photo Number _____

Site & Stream Description small creek cutting through tall grass

Surface Water Characteristics (color, odor, appearance): clear, odorless

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream) Across-stream

Sample ID: 1605 SW MST 274 Sample Time: 12:30

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	12:30		
Water Temperature (°C)	12.3		
Specific Conductivity (µS/cm) @ 25° C	354.3		
Conductivity (µS/cm)	419.6		
TDS (g/L)	TO		
Dissolved Oxygen (% sat.)	86.4		
Dissolved Oxygen (mg/L)	9.14		
pH	7.91		
ORP (mV)	29.1		
Turbidity (FTU) NTU	7.48 NTU		
Air Temperature (°C) °F	50 F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 05/13/16

Time 12:35

Station Number MST 274

Completed by: BJ. TO

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 8.5 ft L.E.W. 13.8 ft Total Width 16.5 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
8.5	1	0.2	No Flow	13.0	16	0.1	0.15
8.8	2	0.1	No Flow	13.3	17	0.1	No Flow
9.1	3	0.0	No Flow	13.6	18	0.1	No Flow
9.4	4	0.2	0.03	13.8	No Flow		
9.7	5	0.2	0.20				
10.0	6	0.2	0.15				
10.3	7	0.2	0.10				
10.6	8	0.3	0.21				
10.9	9	0.4	0.40				
11.2	10	0.7	1.11				
11.5	11	0.5	0.49				
12.8	12	0.4	0.26				
12.1	13	0.3	0.21				
12.4	14	0.2	0.19				
12.7	15	0.2	0.31				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/12/16 Arrival Time 15:50

Field Personnel

T. Osborn

Signatures

B. Jones

SITE DESCRIPTION

Station Name Tributary to Lone Pine Creek Station Number MST275

Latitude N 4746193.29m Longitude 11465625.39m

Elevation 2,059.68 ft Datum NAD 27 Photo Number _____

Site & Stream Description small stream flowing out of pond with lots of organic build up

Surface Water Characteristics (color, odor, appearance): odorless, ~~light~~ green brown in color

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(Up-stream) Across-stream

Sample ID: 1605SWMST275-U, F Sample Time: 15:55

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	15:55		
Water Temperature (°C)	21.6°C		
Specific Conductivity (µS/cm) @ 25° C	109.9		
Conductivity (µS/cm)	102.9		
TDS (g/L)	— 70		
Dissolved Oxygen (% sat.)	78.0		
Dissolved Oxygen (mg/L)	6.77		
pH	7.55		
ORP (mV)	43.6		
Turbidity (FTU)	45.5		
Air Temperature (°C)	61°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Spring 2016 SW Sampling

Date 5/12/16

Time 16:25

Station Number MS875

Completed by: JO BJ

Checked by: _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)
1	3.0	1.5
2	3.2	1.25
3	3.2	1.5

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TDX2) and 0.8TD = (TD/2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 2
2023619

Section A

Required Client Information:

Company: MWH Global
Address: 2890 E Cottonwood Pkwy Ste 300
Salt Lake City, UT 84121
Email To: emily.yeager@mwhglobal.com
Phone: 801-671-3232 Fax: 801-671-4200
Requested Due Date/TAT:

Section B

Required Project Information:

Report To:
Copy To:
Purchase Order No.:
Project Name: Monarch Spring 2016
Project Number:

Section C

Invoice Information:

Attention: in
Company Name: Monsanto
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #: 36447

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location

STATE: ID

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives										Analysis Test ↓ Analysis Test ↓	Y/N	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	Tom Osborn / MWH	5/12/16	0800	Fed Ex			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Luis Rodriguez

SIGNATURE of SAMPLER: [Signature]

DATE Signed (MM/DD/YY): 5/12/16

Temp in °C
Received on Ice (Y/N)
Custody Sealed Cooler (Y/N)
Samples Intact (Y/N)

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:		Page: <u>2</u> of <u>4</u>	
Company: <u>MWH Global</u>		Report To: <u>TO</u>		Attention: <u>TO</u>		2023484	
Address: <u>2610 E Cottonwood Pkwy</u> <u>Suite 300, SLK, UT, 84121</u>		Copy To: <u>TO</u>		Company Name: <u>Monsanto</u>			
Email To: <u>emily.yeager@MWHGlobal.com</u>		Purchase Order No.: <u>TO</u>		Address: <u>TO</u>		REGULATORY AGENCY <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER _____	
Phone: <u>201-617-3232</u> Fax: <u>201-617-4200</u>		Project Name: <u>Monsanto Spring 2016</u>		Pace Quote Reference: <u>TO</u>			
Requested Due Date/TAT:		Project Number: <u>TO</u>		Pace Project Manager: <u>TO</u>		Site Location: <u>ID</u> STATE: _____	
				Pace Profile #: <u>364912</u>			

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives										Analysis Test ↓	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.		
					COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other								
					DATE	TIME	DATE	TIME																		
1	16055WMST226-U									2																
2	16055WMST226-F									1																
3	16055WMST226-U-MS									2																
4	16055WMST226-F-MS									1																
5	16055WMST226-U-MSD									2																
6	16055WMST226-F-MSD									1																
7																										
8																										
9																										
10																										
11																										
12																										

ADDITIONAL COMMENTS <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> Relinquished by / Affiliation: <u>Tom Osborn / MWH</u> Date: <u>5/13/16</u> Time: <u>0800am</u> Accepted by / Affiliation: <u>Paul Ex</u> </div>		RELINQUISHED BY / AFFILIATION		DATE		TIME		ACCEPTED BY / AFFILIATION		DATE		TIME		SAMPLE CONDITIONS			

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: <u>Tom Osborn</u> SIGNATURE of SAMPLER: <u>[Signature]</u> DATE Signed (MM/DD/YY): <u>05/13/16</u>					

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 4 of 8

Section A

Required Client Information:

Company: **Monsanto Co.**
Address: **1853 Highway 34**
Soda Springs, ID 83276
Email To: **rachel.a.roskelley@monsanto.com**
Phone: **208-547-1248**
Requested Due Date/TAT: **7 business days**

Section B

Required Project Information:

Report To: **Molly Prickett**
Copy To: **TO**
Purchase Order No.: **4511485387**
Project Name: **Monsanto Spchy 2016**
Project Number: **Profile 5**

Section C

Invoice Information:

Attention: **Accounts Payable**
Company: **Monsanto Co.**
Address:
Pace Quote Reference:
Pace Project Manager: **Lori Castille**
Pace Profile #: **26709**

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER_SPILL

SITE ☐ GA ☐ IL ☐ IN ☐ MI ☐ NC
LOCATION ☐ OH ☐ SC ☐ WI ☐ OTHER_MN

Filtered (Y/N)

Requested
Ani

Pace Project No.
Lab I.D.

ITEM #	Section D Required Client Information SAMPLE ID One Character per box. (A-Z, 0-9 / , -) Sample IDs MUST BE UNIQUE	Valid Matrix Codes MATRIX DRINKING WATER WATER WASTE WATER PRODUCT SOIL/SOLID OIL WIPE AIR OTHER TISSUE	CODE DW WT WW P S OL WP AR OT TS	MATRIX CODE	SAMPLE TYPE G=GRAB C=COMP	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives										Requested																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
						COMPOSITE START						COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	pH	Conductivity	Total Metals	Diss Metals	TDS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

Additional Comments:

Total Metals to include: Al, Fe, Mn
Diss Metals to include: Al, Fe, Mn

cd, mn, se EPA 6020A-unfiltered
se EPA 6020A-Filtered
804 EPA 300.0 unfiltered
TDS 5M2540C

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Tom O'Connell/MWH	5/14/16	1400	Fed Ex				Y/N	Y/N	Y/N
							Y/N	Y/N	Y/N
							Y/N	Y/N	Y/N
							Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER:

DATE Signed (MM/DD/YY)

Temp in °C

Received on
Ice

Custody
Sealed Cooler

Samples Intact

2023613

Site Location
STATE: ID

Pace Project No./ Lab I.D.

1

5/10/10	1400
---------	------

Samples Intact
(Y/N)

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:		Page: <u>6</u> of <u>8</u>	
Company: <u>MWH Global</u>		Report To:		Attention: <u>AS</u>		2023614	
Address: <u>2890 E Cottonwood Ave</u>		Copy To:		Company Name: <u>Monsanto</u>			
City/State/Zip: <u>Salt Lake City UT 84121</u>		Purchase Order No.:		Address:		REGULATORY AGENCY <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER _____	
Email To: <u>Emily.Yeager@mwhglobal.com</u>		Project Name: <u>Monsanto Spring 2016</u>		Pace Quote Reference:			
Phone: <u>801-349-6216</u> Fax:		Project Number: <u>to</u>		Pace Project Manager:		Site Location: <u>ID</u>	
Requested Due Date/TAT: <u>Standard</u>				Pace Profile #: <u>36442</u>		STATE: _____	

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives								Analysis Test ↓ Analysis Test ↑	Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
					COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

2		SAMPLER NAME AND SIGNATURE						Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
		PRINT Name of SAMPLER:									
		SIGNATURE of SAMPLER:									
						DATE Signed (MM/DD/YY): <u>5/16/16</u>					

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A
Required Client Information:

Company: MWH global
Address: 2840 E Colburn Pkwy
Suite 300
Email To: emily.yruger@MWHglobal.com
Phone: 801-344-6276 Fax: 801-617-4700
Requested Due Date/TAT:

Section B
Required Project Information:

Report To: TO
Copy To: TO
Purchase Order No.:
Project Name: Monsanto Spring 2016
Project Number: TO

Section C
Invoice Information:

Attention: TO
Company Name: Monsanto
Address:
Pace Quote Reference: TS
Pace Project Manager:
Pace Profile #: 5041m2m

Page: 1 of 2
2023481

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____
Site Location: ID
STATE: ID

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives								Y/N ↓ Analysis Test ↓	Requested Analysis Filtered (Y/N)												Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
						COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other		Se (EPA 6020A)	As (EPA 1631)	Cd (EPA 1631)	Cr (EPA 1631)	Cu (EPA 1631)	Fe (EPA 1631)	Mn (EPA 1631)	Ni (EPA 1631)	Pb (EPA 1631)	Sb (EPA 1631)	Si (EPA 1631)	V (EPA 1631)			Zn (EPA 1631)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	Tom Osborn / MWH	5/12/16	9:00am	Far Ex			

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: <u>Tom Osborn</u>					
SIGNATURE of SAMPLER: <u>[Signature]</u>					
DATE Signed (MM/DD/YY): <u>05/12/16</u>					

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 4
2023478

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:		REGULATORY AGENCY	
Company: <u>MWH global</u>		Report To: <u>TD</u>		Attention: <u>TD</u>		<input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER _____	
Address: <u>2890 E Cottonwood</u>		Copy To: <u>TD</u>		Company Name: <u>Monsanto</u>			
Bkwy, Suite 300, SLC, UT 84121		Purchase Order No.:		Address:		Site Location	
Email To: <u>emily.yenger@mwhglobal.com</u>		Project Name: <u>Monsanto Spring 2016</u>		Pace Quote Reference: <u>TS</u>		STATE: <u>ID</u>	
Phone: <u>801-344-6276</u> Fax: <u>801-617-9200</u>		Project Number: <u>TD</u>		Pace Project Manager:			
Requested Due Date/TAT: <u>Standard</u>				Pace Profile #: <u>36412</u>			

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	Matrix Code (see valid codes to left)	Sample Type (G=GRAB C=COMP)	COLLECTED				Sample Temp at Collection	# of Containers	Preservatives								Y/N Analysis Test ↓	Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
					COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION		DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME	SAMPLE CONDITIONS			
		Tom Osborn / MWH		5/11/16		F&S Ex							

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: <u>Tom Osborn</u>					
SIGNATURE of SAMPLER: <u>[Signature]</u>	DATE Signed (MM/DD/YY): <u>05/11/16</u>				

L. Rodryga
A. Pettley

Monseato
Spray 2016
Sampling

5/9/16 103

- 1100 Arrived at Mine office, near plant,
checked in with security.
- 1130 Arrived at #4 mine ops office. Received safety
training from #4 personnel, signed in.
- 1230 Completed safety training and site induction.
Issued buggy whip, chock blocks, and radio
- 1300 Arrived at Fox Hill Shop. Picked up and
loaded sampling equipment. Distributed relevant
paperwork.
- 1400 Returned to #4 Mine ops office to meet
w/ Shanna concerning batteries for well
pump.
- 1402 Received 2 extra batteries for potentiometer
and 2 bladder pump controllers.
- 1405 Heading to mine site to pick up gas air compressor.
- 1415 Did not locate air compressor at Ballant ship,
headed to Daguerre to pick up Nitrogen and more.
- 1425 At Daguerre, loading Nitrogen and more.
- 1500 Loaded Nitrogen, leaving Daguerre Shop
*- Had buckets, wrench ships, and fittings for air hose.
- 1505 On S. Reservoir, headed to first well site
- 1520 At first well site (MW-25), checking location
off of Daguerre Road RD.
- 1527 MW-25 - 27.50' from Top of PVC
Setting up controller for Nitrogen pump

A. Pettker
L. RodriguezMonsanto
Spring Zone

5/9/16

- 1608 Pumping water on MW-25 to purge well, starting on water quality parameters.
- 1619 .7L/min purge rate
- 1624 33.6' from top of casing (REF), took parameters
- 1630 Water level at 36.3' from REF, took parameters
- 1640 Water level at 39.0' REF, took parameters
- 1647 Water level at 40.3' REF, packing up, leaving to next site.
- 1703 At MBW 99, setting up peristaltic pump
- 1708 Water level at .95' below TOC
- 1713 Water level at 4.98' below TOC (17.29 total depth)
Purge = .35"/min
Temp: 6.91°C
pH: 7.17
ORP: 144.7 mV
DO: 4.65 mg/L
SC: 331 $\mu S/cm$
Turbidity: 0 NTU
- 1718 8.13' below TOC, took parameters
- 1723 Pumping well dry, will return to surface when well has recharged. 11.13' TOC
- 1733 Pumped dry, will return when sufficiently recharged. Left well site.
- 1746 Left Dajastan Shop Area.
- 1810 Signed out of mine office

14

MONSANTO
Spring 2016

5/10/16

A. Pettker

- 0630 MWH calibrating Water Quality Meter YSI 6920 S/N 70063.
- pH 7 reading = 7.00 @ 16.95°C No cal. ^{check}
- 0656 Meter YSI 6920 S/N 70067
pH 10 reading = 10.12 @ 17.30°C, Needs Cal
- 0700 Calibrated Sonde to 10.00 pH
Reading 10.00 pH @ 17.25°C
- 0707 Calibrating Sonde to 1409 $\mu S/cm$
Reading 1439 $\mu S/cm$ @ 16.8°C
Calibrated to 1409 $\mu S/cm$ @ 16.87°C
- 0715 Calibrating Sonde @ RP
Using Zorbell Solution, calibrated to ^{236.2} ~~236~~ ORP @ 16.38°C
- 0728 Calibrating for Turbidity with 126 NTU
Reading 179 NTU, should be 126 NTU
- 0734 Calibrating for Turbidity to 40 NTU
Reading 69 NTU for 40 NTU Sol'n
Calibrated to 40 NTU
- 0740 Calibrating for 0 NTU Turbidity
Reading 15.1 NTU, cal'd to 0 NTU
Reading did not stabilize to 40 NTU using 40 NTU calibration solution
- 0743 Calibrating to 100 NTU, Reading 35 NTU, calibrating Sonde to 2 points, 0 NTU and 100 NTU
- 0746 Attempted to calibrate 2 points, 40 NTU overranged.

106 A. Pettley
L. Rodriguez

Monsanto Sampling
Spring 2016

5/10/16
~35-40°F
snowy, cloudy,
SW wind 5-15 mph

- 0746 Calibrating to ONTU w/o ONTU sol'n.
ONTU cal sol'n is needed. ONTU
- 0750 ~~Calibrating~~ Setting barometric pressure
- 0842 Signing in at the mine office. Filled out JSA.
- 0903 Received new air compressor at mine office, leaving mine office for ship to pick up generator.
- 0915 At Dagerstan Ship, looking for generator for air compressor.
- 0955 At Rasmussen thal mud, picking up generator.
MMW-025
- 1005 At MMW-026, nitrogen well, no lock on monument.
- 1013 Water level at 284.65' below TOC.
Setting pump and water pumpers equipment
- 1022 Starting pump and well pump
- 1037 Took parameters, pumped ~3.5 L, need 2.7 L for full purge vol.
- 1042 Flow rate 650 mL/min, .65 L/min
Water level @ 284.7' below TOC
- 1109 Flow rate 650 mL/min, .65 L/min
H₂O @ 284.7' below TOC
- 1127 H₂O @ 284.7' below TOC, purging .65 L/min, 35.25 L
purge volume
T = 9.18°C, pH = 7.46, ORP = 48.6 mV
DO = 0.05, SC = 427 µS/cm, Turb = 0.9 NTU
Took sample 1605 MMW026-U, F @ 1127
1 unfiltered, 1 filtered w/ HNO₃, 1 unfiltered w/ HNO₃

A. Pettley
L. Rodriguez

Monsanto
Spring 2016

5/10/16

107

- 1146 Downloading transducer data, cleaning up well site equipment
- 1155 leaving MMW-026, no lock on monument
Downloaded transducer data.
- 1212 At Ballan, pulled up to MMW021.
- 1220 ~~At~~ DTW 209.92' below TOC
No lock on monument, casing cap too tight to
close top.
- 1225 Started pump to begin purging, ~~adjusted~~ cartoller
battery level, needed to charge
- 1242 DTW 210.05' B TOC, .25 L/min purge rate
T = 8.24°C, pH = 7.27, ORP = 127 mV
DO = 0.05 µ/L SC = 622 µS/cm Turb = 0
- 1252 Took parameters and water levels.
- 1302 DTW 210.11' below TOC
- 1315 Initially H₂O sample bottles
ID: 1605 GW MMW021-U, F
- 1332 Purged hole volume, taking parameters every
5 min.
- 1342 Took samples
DTW 210.12' below TOC, .3 L/min purge, 20 L total
Temp = 9.52°C, pH = 7.19, ORP = 133.3 mV
DO = 6.16 µ/L, SC = 625 µS/cm, Turb = 0 NTU
- 1357 Downloaded transducer data, cleaned up well
site, leaving to next site

108 A. Rettler
L. Rodinjan

Monsanto
Spring 2016

5/10/16

1403 At MMW006. DTW 265.5' ^{5'} below TOC

1413 Setting up pump. One N tank is empty, will need new tanks per tomorrow (5/11)

1417 Started pumping

1423 DTW 265.58' TOC

T: 8.73°C, pH: 7.54, ORP: 127.1 mV

DO: 0 SC: 507 $\mu\text{S}/\text{cm}$, Turb: 0

1426 Need to use freeze at line for pump, parameters may be delayed.

1430 Purge rate .35 L/min

1452 DTW 265.61' TOC. Using freeze out line may cause DO levels to fluctuate.

1455 Sample TO will be: 1605 GW MMW006-U, F

1530 DTW 265.61' TOC, ~.35 L/min purge, 25.0L _{total}

Temp: 9.24°C, pH: 7.53, ORP: 125.4 mV

DO: 5.02 mg/L SC: 523 $\mu\text{S}/\text{cm}$, Turb: 0 NTU

- Bubbles formed around sensors for Turb and DO, causing higher than actual readings. Final parameters were taken after bubbles around sensors were shaken off.

- Took samples @ 1530

- Downloaded transducer

1544 Head to next well.

1653 At MMW-16A

A. Rettler
L. Rodinjan

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Spring 2016

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1355 DTW 4.39' TOC

1604 DTW 6.71' TOC, purge rate @ .25 L/min

1701 DTW 6.88' TOC, 0.3 L/min purge 14.5L

Temp: 6.73°C, pH: 7.33, ORP: -78.2 mV

DO: 0 SC: 1655 $\mu\text{S}/\text{cm}$ Turb: 0

- Sampled @ 1650

1605 GW MMW16A-U, F

1 unfilled, 1 filled w/HNO₃, 1 unfilled w/HNO₃

- Downloaded Transducer

- No lock on Monsanto

1708 At MMW030, setting up compressor and generator for parameters. Will leave nitrogen at site overnight for full purge. DTW 21.90' TOC

1715 Started compressor, started purging

1720 DTW 22.85' TOC, 1.0 L/min purge ~2.5 L

prior to sampling parameters

Temp: 8.83°C, ~~9.83~~ pH: 7.62 ORP: 66.4 mV

DO: 0 SC: 413 $\mu\text{S}/\text{cm}$ Turb: 0

- Allowing for purge of well, sampling every 20 minutes

- Downloaded transducer and saw that pressure sensor

1755 DTW 29.09' TOC

1815 leaving nitrogen bottle at well site to purge well overnight

A. Pettles Monsanto
 L. Rodriguez Spring Zone 5/10/16
 1818 leaving MMW030
 1830 ~~off site~~ at A. Pettles and L. Rodriguez
 Signed out and off site.

WR

A. Pettles
 L. Rodriguez

Monsanto
 Spring Zone

clear, 50', breezy 111

5/11/16

No40 MWH calibrating YSI 6920.
 s/n 70063.

- pH 7 reading = 6.87 @ 14.43°C calibrated to 7.00 @ 7.00
- pH 10.18 ^{14.09} 10 readings 10.18 & 14.47°C calibrated to 10.00 good.
- SpC reading 1410 @ 14.60°C no calibration needed
- ORP reading 236 mV @ 15.00°C no cal. needed. Zohll's cal switch.
- NTU ϕ reading 0.0 @ 14.32°C no cal needed.
- NTU 40 reading 39.5 @ 14.37°C no cal needed.
- D.O. sensor reading 8.62 mg/L @ 14.46°C and BARD 30.30 "Hg no cal. needed.

0800 picked up ice for coders. Other jump holes to name home to ship out coolers.

0824 Signed in at river of fun. Dropped all batteries up Shawna, picked up radio

0836 At MMW030, picking up equipment, filled at JSA.

0840 BTW @ 14302' TOC

0843 leaving MMW030, left Nitro bottle at well site.

0851 At MMW032

A. Pettles
112 L. Rodriguez

Monsanto
Spring 2016

5/11/16

0903 DTW 18.25' TOL

0910 Started to pump and sample

0917 Pump rate ~ 1.75 L/min

1020 Finished pumping, clearing up well site

DTW @ 60.84' TOL, pumped 113.25 L

Temp: 6.30 °C pH: 7.51 ORP: 151.7 mV

DO: 6.57 mg/L SC: 6.57 $\mu\text{S}/\text{cm}$ Turb: 0

- No Transducer

1032 At MMW 018, DTW @ 8.46' TOL

1040 Started pumping. Will be sampling

1605 GW MMW 018 - U, F, MS, MSDR

1147 DTW @ 8.70' TOL

Took MS/SDS samples.

@ 1123 DTW @ 8.65' pumped 5.0 L

Temp: 7.64 °C pH: 7.29 ORP: 160.4 mV

DO: 7.03 SC: 419 $\mu\text{S}/\text{cm}$ Turb: 0

- Downloaded Transducer

1200 Filling out chain of custody.

1213 At MMW 029 DTW @ 13.46' TOL

1250 Sampled well - 1605 GW MMW 029 - U, F

DTW @ 13.64' pumped 14.75 L

Temp: 8.12 °C pH: 6.74 ORP: 174.1 mV

DO: 7.27 mg/L SC: 1562 $\mu\text{S}/\text{cm}$ Turb: 0

- Downloaded Transducer

1305 At MMW 033 DTW @ 6.29' TOL

A. Pettles
L. Rodriguez

Monsanto
Spring 2016

5/11/16 113

1323 Issues with sonde, needing zero DO,
removed sonde from sample cylinder and DO sensor
is functional, no plug sonde on cylinder.
- Parameters at 1315 are off.

1325 DTW @ 13.96' TOL

Note: Permission was given by Monsanto
personnel to sample 10x the low flow
volume and establish stable parameters in the
Spring of 2012 sampling round. This criterion
was carried over to the 2016 sampling round.
This well will not hold the low flow
method and is too large to pump dry with
a bladder pump.

- Initial parameters @ 1325

DTW @ 13.96' Pump volume @ 30 L

Temp: 6.66 °C pH: 7.79 ORP: 78.0 mV

DO: 0.23 mg/L SC: 473 $\mu\text{S}/\text{cm}$ Turb: 0

1415 Sampled well. 1605 GW MMW 033 - U, F

Final Params: DTW 26.26' TOL pumped 105 L

Temp: 6.66 °C pH: 7.70 ORP: 49.2 mV

DO: 0.05 mg/L SC: 465 $\mu\text{S}/\text{cm}$ Turb: 0

- No Transducer

1437 At MMW 032, sampling duplicates.

DTW @ 7.35' TOL

A. Pettley
L. RodijaMonsanto
Spring Zone

5/11/16

1450 Pankus (Initial)

Temp: 4.66 °C pH: 7.14 ORP: 129 mV
 DO: 6.70 mg/L SC: 2018 $\mu\text{S}/\text{cm}$ Turb: 0.8 NTU

1500 Final Pankus

DTW @ 7.37' TOC Pagen 4.25L
 Temp: 4.72 °C pH: 7.12 ORP: ~~226~~ 135.5 mV
 DO: 6.62 mg/L SC: 2087 $\mu\text{S}/\text{cm}$ Turb: 0

- No Trenches

+ Sampled Duplicates

1527 Catching up on chain of activities, leaving well site, locked gate.

1604 At MMW 017, DTW 38.68' TOC

Very low recharge, may take some time to discharge water w/out changing dampst .3'.

1635 Initial Pankus

Temp: 11.11 °C pH: 6.89 ORP: 156.8 mV
 DO: 6.67 mg/L SC: 1781 $\mu\text{S}/\text{cm}$ Turb: 0
 - Trench Dampst

1755 Final Pankus

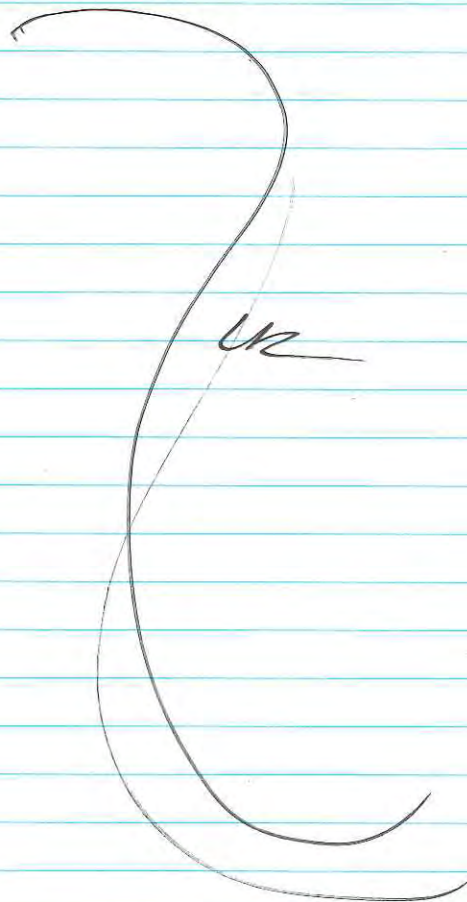
Temp: 10.63 °C pH: 6.82 ORP: 171.2 mV
 DO: 6.26 mg/L SC: 1379 $\mu\text{S}/\text{cm}$ Turb: 0

A. Pettley
L. RodijaMonsanto
Spring Zone

5/11/16

1810 Left MMW 017

1815 Signed out at Mine office gate
 A. Pettley and L. Rodija off site.



5/12/16

A. Pettley

0625 Mutt personal meeting for
morning meeting. JSA discussion.Sampling in Henry, lifting, driving,
slips/trips falls.0630 Calibration of YSI meter 6920
sh 70063.- pH 7 reading = 7.02 @ 17.02°C no
cal. needed.- pH 4 reading = 4.02 @ 17.09°C
no cal. needed.- pH 10 reading = 9.99 @ 17.10°C
no cal. needed.- Conductivity 1409 reading = 1410 @
17.21°C no cal. needed.- ORP Zedull's reading = ~~32~~ 232.6 mV
@ 16.62°C should be 233.9 mV
no cal. needed.- VTO 0 reading = 0.0 @ 17°C
no cal.- NTU 40 reading = 39.5 @ 17.21°C
no cal.- D.O. Sensor reading 8.57 @ 17°C
30.30" Hg. D.O. sensor showing
0.00 mg/L at 4, not. no roomA. Pettley
L. ReddyMonsanto
Spring 20165/12/16
Clear, ~50°
light breeze

0700 Preparing samples to ship out today.

0800 left the house.

0805 Fueling up and getting supplies for the day.

0815 At Air gas, picking up Nitrogen cylinders.

0830 Picked up 2 "300" and 1 "200" tank,
dropped off 2 "300" tanks, total
was \$130, may need to RE Dagerstan
about total.0838 Signed in at Mine office, picked up batteries,
talked to Shuman.0901 At Fox Shop, picking up coolers for the
day. Pre-op'd vehicle.

0921 At Henry's house

0943 MMW023 DTW 106.60' TOC

0949 Started pumping.

0956 Initial Parameters

DTW 106.60' TOC purge rate: 0.85

Temp: 9.26°C pH: 6.90 ORP: -95.9 mV

DO: 0.36 mg/L Σ : 974 μ S/cm Turb: 0

1031 Final Parameters

DTW 106.62' TOC, total purge 28.5L

Temp: 9.16°C pH: 6.99 ORP: -113.5 mV

DO: 0.02 mg/L Σ : 983 μ S/cm Turb: 0

- Downloaded Transducer.

1046 Cleaned up well site, moving to next site.

A. Retter
118 L. Rodriguez

Monsanto
2016 Spring

5/12/16
~500 b.m.y

1103 At MMW011

1107 DTW@13.55' TOL, needed to adjust
pump rate to reduce drawdown.

1125 Initial Parameters

Temp: 10.14°C pH: 7.35 ORP: 79.7 mV
DO: 5.91 mg/L SC: 833 µS/cm Turb: 0

1155 Final Parameters DTW 13.75' TOL, 8.75 total purge
Temp: 10.31°C pH: 7.28 ORP: 94.4 mV
DO: 5.73 mg/L SC: 833 Turb: 0
- Downloaded transducer and Bore.

1228 At MMW028 DTW@63.96' TOL

1252 Run air compressor down. Had to restart.

1309 Initial Parameters @ 1235

DTW@63.96' TOL, .75 l/min

Temp: 8.64°C pH: 7.73 ORP: 568 mV
DO: 7.03 mg/L SC: 568 µS/cm Turb: 0 HTU

1311 Final Parameters DTW 63.96' TOL, purge 12.25 L

Temp: 8.35°C pH: 7.53 ORP: 101.2 mV
DO: 6.88 mg/L SC: 568 µS/cm Turb: 0 HTU

- Transducer is bad, did not download. Download
error. Recommend replacing.

1347 At MMW022 DTW @ 201.95' TOL

1400 Initial Parameters DTW 202.08' TOL, pump rate .25 l/min
Temp: 10.45°C pH: 7.78 ORP: 100.2 mV
DO: 9.10 mg/L SC: 944 µS/cm Turb: 0

180

A. Retter Monsanto 5/12/16
L. Rodriguez Spring Zone 119

1440 Downloaded Transducer

1548 Final Parameters

Temp: 9.15°C pH: 7.10 ORP: 4.33 mV
DO: 4.33 mg/L SC: 925 µS/cm Turb: 1.3
- Downloaded Transducer

1601 At MMW010

DTW@0.55' TOL

1608 Initial Parameters DTW@1.00' TOL, 1.0 l/min
Temp: 8.02°C pH: 6.74 ORP: 169.1 mV
DO: 2.24 mg/L SC: 1717 µS/cm Turb: 1.1

1633 D.O. was unstable throughout test
possibly due to a 'sticking effect'
of the well, very fast recharge, located
in the middle of a small marsh.

DTW@1.61' TOL, 2.5 L total purge
Temp: 7.04°C pH: 6.45 ORP: 175.9 mV
DO: 0.73 mg/L SC: 1793 µS/cm Turb: 0

- Downloaded transducer.

1705 Signed out at the Mine office.

L. Rodriguez and A. Retter off site.

120

5/13/16

L. Rodriguez

A. Pettley

0620 MWH begins calibration on

YST meter s/n 70063

- pH 4 reading = 4.02 @ 17.88°C NO cal. needed.

- pH 7 reading = 7.01 @ 17.84°C NO calibration needed

- pH 10 reading = 9.98 @ 17.81°C NO calibration needed.

- Conductivity 1409 reading = 1408 17.21°C, NO calibration needed.

- ORP Zobell's reading = 230.7 @ 18.31°C NO cal. needed.

- O₂ NTL reading = 0.1 UTLis, NO cal. needed.

- 40 NTL reading = 39.5 UTLis @ 18.3°C NO cal needed.

- D.O. reading 7.07 mg/L @ 18.07°C NO cal. needed BARO 30.20 "Hg.

0740 Performed PreOp on truck, reviewed JSA

0840 Gathered supplies for the day. Dropped off samples at the Monsanto warehouse for shipment. Will need to track delivery to ensure Saturday arrival.

0855 Signed in at gate, picked up radio

0910 Driving Hwy Daystar pit, access road closed off

A. Pettley

L. Rodriguez

Monsanto

Spring 2016

5/13/16

600, sunny 121

light breeze

Announcing activities. Need to find and estimate water. Sampling in French Valley.

0930 At MWH 009 DTW @ 211.05' TOC

0945 Initial Parameters

DTW @ 211.15' TOC, 0.25 ²/min

Temp: 9.54°C pH: 7.47 ORP: 140.1 mV

DO: 7.52 % SC: 625 ²/cm Turb: 0

1035 Discovered tubing length to be incorrect (350') in 2015 sampling, changed to 552' and are pumping 34.1 L, from the previous 22 L.

1110 Final Parameters DTW @ 211.15' TOC, 35.85 L pumped

Temp: 9.35°C pH: 7.10 ORP: -1.5 mV

DO: 0.9 % SC: 639 ²/cm Turb: 0

- Downloaded Baro and Turbidity.

1127 Packed up equipment, headed to next site.

1140 Looking for branches

1147 MBW 112

DTW @ 17.38' TOC, TD @ 17.59, water in

DRY ending only.

1204 MWH 027 - DTW @ 91.69' TOC

1215 Initial Parameters DTW @ 91.75' TOC, .55 ²/min

Temp: 8.44°C pH: 7.25 ORP: 91.3 mV

DO: 4.29 % SC: 1101 ²/cm Turb: 0

1235 Final Parameters DTW @ 91.75' TOC, 12.25 L

Temp: 8.34 pH: 7.07 ORP: 104.9 mV

DO: 3.09 % SC: 1115 ²/cm Turb: 0

A. Pettler Monument
L. Rodger Spring 2010

8/13/10

1245 At MMW035 DTW 92.81' TOL

* Active Wasp nest in casing

1250 Initial Parameters DTW @ 92.88' TOL, .45 $\frac{L}{min}$

Temp: 8.30°C pH: 7.03 ORP: 108.4 mV

DO: 1.83 $\frac{mg}{L}$ SC: 1444 $\frac{\mu S}{cm}$ Turb: 0

1315 Final Parameters DTW @ 92.87' TOL, 13.75 L $\frac{pumped}{min}$

Temp: 8.29°C pH: 6.95 ORP: 120.3 mV

DO: 2.06 $\frac{mg}{L}$ SC: 1456 $\frac{\mu S}{cm}$ Turb: 0

- Downloaded trencher.

1335 NBW107 DTW @ 34.50' TOL, TD 39.25'

- Not dry, has water

- Too deep to run peristaltic pump, no bailer
small enough readily available, no bladder pump.

1355 MMW037 DTW @ 113.30' TOL

- Duplicate:

- Trial run with compressor and woodbit produce
water, switched to Nitrogen, A-OK

1410 Initial Parameters DTW @ 113.35', 0.4 $\frac{L}{min}$

Temp: 9.87°C pH: 7.57 ORP: 124.5 mV

DO: 5.66 $\frac{mg}{L}$ SC: 936 $\frac{\mu S}{cm}$ Turb: 0

1500 Final Parameters DTW @ 113.35', 21.5 L total $\frac{pumped}{min}$

Temp: 9.60°C pH: 7.51 ORP: 137.8 mV

DO: 7.76 $\frac{mg}{L}$ SC: 428 $\frac{\mu S}{cm}$ Turb: 0

- Downloaded trencher.

- Sample duplicate @ 1410

- Note: MMW012 Dry - NO Sample

A. Pettler Monument
L. Rodger Spring 2010

5/13/10

1511 MMW036 DTW @ 112.63' TOL

1515 Initial Parameters DTW @ 112.68' TOL, .35 $\frac{L}{min}$

Temp: 10.20°C pH: 7.66 ORP: 135.2 mV

DO: 8.66 $\frac{mg}{L}$ SC: 423 $\frac{\mu S}{cm}$ Turb: 0

* Lots of bubbles exiting boring, causing high
DO readings, cannot repeat with correct
equipment.

1540 Final parameters DTW @ 112.66' TOL, 10.75 L $\frac{pumped}{min}$

Temp: 9.00°C pH: 7.52 ORP: 142.2 mV

DO: 7.51 $\frac{mg}{L}$ SC: 421 $\frac{\mu S}{cm}$ Turb: 0

- Sampled for MS/MSD

- Downloaded trencher.

1600 Leaving Enoch Valley

1617 Meeting w/ B. Toms and 2 others.

1633 At MMW031 DTW @ 97.63' TOL

1640 Initial Parameters DTW @ 97.77' TOL, .7 $\frac{L}{min}$

Temp: 9.99°C pH: 7.89 ORP: 114.6 mV

DO: 9.03 $\frac{mg}{L}$ SC: 265 $\frac{\mu S}{cm}$ Turb: 0

1700 Final Parameters DTW @ 97.83' TOL, 16.0 L $\frac{pumped}{min}$

Temp: 9.57°C pH: 7.82 ORP: 121.8 mV

DO: 9.57 $\frac{mg}{L}$ SC: 260 $\frac{\mu S}{cm}$ Turb: 0

- Downloaded trencher

1714 Leaving MMW031

1720 Signal out at mine office

L. Rodriguez and A. Pettler off site

2

5/14/16

A. Pettley

0630 Calibration on YSI meter

6920, s/n 70063 multiprobe.

- pH 4 reading = 4.02 @ 19.67°C NO cal needed
- pH 7 reading = 6.99 @ 19.73°C NO calibration needed.

- pH 10 reading =

- Conductivity 1409 reading = 1419 @ 19.70°C. cal. to 1409. Cal. good.

- ORP Zokell's reading = 228 mV. NO cal needed. Solution at 19.81°C.

- NTU D.O. reading = 0.2 NTUs NO cal.

- NTU 100 reading = 99.5 NTUs NO cal needed

- D.O. sensor reading 7.49 @ 19.52°C

BARO 615.6 mmHg. good.

0830 Pre-Op Truck, JSA (run out of sheets)

- Traveling to Ballard Area ^{flares}

- Documenting Tiembaan data, getting meeting well supplies,

- body / valving nitrogen bottles / Tean lift / Heavy loads

- High air pressure / use correct fittings, treat all lines as pressurized

- Traveling high weight terrain / fuel w/ caution, 4x4 where needed

0818 Sign in at Mine Office Mailbox

0825 At Fox Shop. Looking for boiler, picked up 2 extra coolers.

0910 New Reservoir Head road

0911 MHW001 DTW @ 34.75' TOL

1012 Hoed to drawdown water to a stable level before taking water samples.

1013 May have hit stabilization point. Will be deducing flow rate.

*0920 Initial Parameters DTW @ 38.11' TOL, .75% min

Temp: 7.76°C pH: 7.01 ORP: 148.2 mV

DO: 2.37 mg/L SC: 246 μ S/cm Turb: 0.3 NTU1120 Final Parameters DTW @ 72.0' TOL, 87.4 μ g/L

Temp: 10.19°C pH: 7.06 ORP: 152.2 mV

DO: 2.15 mg/L SC: 277 μ S/cm Turb: 0

- Downloaded turbidity and BOD.

1149 A & MHW 025, broken inlet line on bladder pump. Repairing.

1157 Needed to bypass air line on PVC disk.

NEEDS REPAIR

* Bladder inlet brass fitting sheared off plastic line, needs new brass fittings

1145 Initial Parameters DTW @ 38.64' TOL, 0.2% min

Temp: 11.08°C pH: 7.87 ORP: 127.7 mV

DO: 3.66 mg/L SC: 288 μ S/cm Turb: 0

1225 Final Parameters DTW @ 40.10' TOL, 5.5L per gal

Temp: 9.88°C pH: 7.95 ORP: 128.3 mV

DO: 1.16 mg/L SC: 289 μ S/cm Turb: 0

- Downloaded turbidity

- 1247 Picked up Nitro. Cylinder left at mine 200
from Monday, held to next one
- 1259 MMW099 - sized up boiler from Fox
w-hose, does not fit on long steam pipe.
- 1301 DTW @ 1.91' TOC, not enough water to run
flow through cell, will fill Cal. cup and
measure 3 permeator sets from there.
- 1319 Pumped and separated permeate
- 1335 Roping off Nitro tank and cables (to the ken)
at Daystar ship.
- 1353 MMW024 DTW @ 54.19' TOC.
Initial Permeator
Temp: 8.61°C pH: 7.21 ORP: 143.9 mV
DO: 2.72 mg/L SC: 933 μ S/cm Turb: 0
- 1411 Final Permeator DTW @ 54.99' TOC, 14.02 purged
Temp: 8.07°C pH: 7.07 ORP: 152.1 mV
DO: 2.30 mg/L SC: 1026 μ S/cm Turb: 0
- ~~1411~~ - Damaged turbine
- 1433 At MMW013 DTW @ 3.25 TOC
- 1438 Initial permeator DTW @ 3.35 TOC, 0.7 min
Temp: 7.74°C pH: 7.06 ORP: 163.4 mV
DO: 8.78 mg/L SC: 686 μ S/cm Turb: 0
- 1453 Final Permeator DTW 3.30' TOC 14.15 L purged
Temp: 7.37°C pH: 7.06 ORP: 167.2 mV
DO: 8.97 mg/L SC: 680 μ S/cm Turb: 0
Damaged turbine

- 1501 MMW034 DTW @ 7.10' TOC
- 1505 Initial Permeator DTW @ 7.25' TOC, 0.35 min
Temp: 7.79°C pH: 6.91 ORP: 172.1 mV
DO: 8.76 mg/L SC: 680 μ S/cm Turb: 0
- 1545 Final Permeator DTW @ 7.31' TOC, 15.25 L purged
Temp: 8.12°C pH: 7.36 ORP: 164.6 mV
DO: 9.51 mg/L SC: 554 μ S/cm Turb: 0
- No turbine
- ~~1545~~
- 1600 leaving Daystar ship
- 1623 Signed out at mine office.
L. Rodriguez and A. Pettler off site.

Monsanto

128

5/15/16

A. Pettley
0600 MWIT calibrating the YSI
6920 water quality meter. S/N #
70063.

pH 4 reading: 3.98 no cal. needed.

pH 7 reading: 6.95 @ 20.60°C, cal.
to 7.00. Now readings 7.00 good.

pH 10 reading: 9.98 @ 20.37°C no cal.

Conductivity 1409 = reading 1385 @
20.50°C. calculate cal. to 1409 good.

- ORP Zosell's = @ 20.18°C reading
228.5. no cal. needed.

- NTU D. reading: 0.0 @ 24.02°C
no cal.

- NTU 40 reading: 39.5 NTUs @
20.0°C no cal.

- D.D. reading 7.47 @ 29.90 inHg
no cal. needed.

0820 Arrived at the Monsanto
office gave sign in.

0825 At the Monsanto office, pick up
(2) batt. for radio. Also grab
(2) CDC's from Shawana's office
Class #5.

0845 Arrive at MMW032

5/15/16

T. Osborn
A. Pettley 129

MMW032 Sample after poured dry on
Time 0915 pH 7.36

H₂O level 22.80ft ORP 190.2 mv

Purge Rate 0.75 L/min DO_{sat} 7.06

Cumulative Purge Volume 15.0L Sp. C. 382 µS/cm

Temp C 6.13°C Turbidity 0.0 ntu

previous day (5/11/16)

1005 Arrived at MMW020 started
work. DTW = 274.25 TON.

Beginning Parameters = Vol 2 L.

Temp 8.10°C, pH 7.41, ORP 187.1,

D.O. 9.39, SC 1410, NTU 83.4

Flow inconsistent.

Downloaded transducer data.

Stuck around pump line. Data
appears to be void from 4/16 to
5/16.

1120 Sampled 16056WMMW020-F,U

find parameters = WL 247, 274.25,

Total removed 49.5L, Temp 8.77°C,

pH 6.96, ORP 164.7, D.O. 0.20,

SPC 899, NTU 0.8.

1200 At MW-15A DTW = 18.34 TON

beginning parameters = ^{Temp} 7.69°C, pH 6.78,

ORP 174.8, D.O. 3.14, SPC 1655, NTU 0

130

5/15/16

Monsanto
Spring 2016rain ~ 45°F
T. Calome
A. Pettley1240 Sampled 1605GWMW15AFinal Parameters: WL 19.60, Total 8.0 L
Temp 7.99°C, pH 6.71, ORP 172.8, D.O.
3.51, SPC 1677, NTH 0.6.Note: Low flow started at 12:15 and
~ 1.21' drawdown, pumping rate
and WL stable after that. good.1310 Arrived at mmw030 to
continue sample. Well has recovered
and sampling begins. DTW = 29.111340 Sampled mmw030 1605Gwmw030F.V. Final: WL: 33.00, Vol 10 L.
Temp 8.72°C, pH 7.72, ORP 142.5,
D.O. 2.53, SPC 405, NTH 0.1355 At MBW006 DTW: 2.25',

starting purge w/ Parasolre pump.

beginning parameters: .5L, Temp 6.59°C,
pH 7.22, ORP 164.5, D.O. 6.74,
SPC 1105, NTH 0.1430 Sampled 1605GWMBW006final parameter: WL 2.33, purge rate
.25 L/min, Vol 5.25 L., Temp 6.68°C,
pH 6.68°C, pH 7.17, ORP 163.9,
D.O. 6.55, SPC 1081, NTH 0.3

1630 Back to Transducer MW-15A. NO lock.

Monsanto
Spring 2016cloudy 45°F
T. Calome
A. Pettley

5/15/16

1645 Note: MWH returned sampling

equipment to the Monsanto
office (Sharon's office).Gate unlocked (South gate) and
main door accessed. All door's
and gates relocked when departed.Also, Nitrogen tanks returned
to Degerstrom (2) full +
(2) empty. Cradle for tanks
placed near drop area.- 1650 MWH Signed out
at Gate.

A. Pettley

5/16/16

0700 Arrived at the Monsanto
Mine office to sign in.0730 At the Agerstrom shop to return
(1) generator & (1) gas can to
the management.0800 Collecting info for Cary Foulke
regarding sediment basins + erosion
channels. Henry Site0930 Completed Cary Foulke inspection
Henry Site.1015 Returned to the Monsanto office
returned (2) web cradles for
transducer download. Shawna O.1100 MWH Packing (4) coolers
with samples. (2) additional coolers
with unused bottles + lab stuff.1400 Arrived at Fed Ex to ship
Env. Equipment + Lab Samples.

Note: Cooler sent
from Fed Ex on
5/17/16 to Lab.

5/9/16

1130 sign into mine office watch
safety video

1230 go to Fox shop prep equipment

1420 arrive at black foot river MST 19

calibrate pH 4

- Flow rate not possible due to high flow
stream gauge submerged will reference
USGS stream gauge at Black foot River

1505 Temp 12.5°C

DO% 94.0% PH 7.48

DO^{mg/L} 8.0^{mg/L} pH^{mV} -59.1

~~TD~~ ~~Spc Cond~~ ~~330.5~~ ^{us/cm} ORP 107.7 mV

Turbidity 13.5 NTU Cond 251.3 ^{us/cm}

Spc Cond 329.7 ^{us/cm}

17:41 MST 050

Temp 16.1°C PH 7.99

~~Spc~~ Cond 233.0 ^{us/cm} ORP 131.9 mV

Spc Cond 280.9 ^{us/cm} Turb 3.02 NTU

DO% 103.2 Air Temp 49°F

DO ^{mg/L} 8.10

18:30 sign out mine office

No. 390NF # 'D JOURNAL - FAB



6 32281 39041 1
ISBN 978-1-932149-52-4

5/10/16

0648 Calibrate YSI professional plus
hand held

Barometric pressure 30.10 in calibration

DO% 85.3% → 84.7%

DO % 8.85 → 8.78 %

SPC 1703 $\frac{mg}{L}$ after calC 1409 $\frac{mg}{L}$ after cal

ORP @ 16°C 236 mV reading 236.1 mV

pH 4 reading 4.00 after cal

pH 7 reading 7.00 after cal

pH 10 reading 10.00 after cal

0830 Arrive at MST050 collect stream
Flow data0930 Arrive at MDS030 collect stream
Flow data after water sample
was collected

	sample #1	sample #2
Temp °C	8.1	8.3
Sp C	944	934
C	640	637
DO%	64.5%	54.5
DO mg/L	7.31	6.28
pH	7.47	7.14
ORP	92.6	97.7
Turbidity	0.29	0.27
Air Temp °F	35°F	35°F

1045 arrive at MST092

Water Temp °C 7.3°C pH 7.62

Sp C 564.1 ORP -74.0

C 373.4 Turbidity 1.38

DO% 59.8 Air Temp 35°F

DO mg/L 7.15

1209 arrive at MST087

Time	sample 1 12:18	sample 2 12:22	sample 3 12:26
------	-------------------	-------------------	-------------------

H₂O Temp 8.9°C 8.9°C 9°C

Sp C 456.6 455.6 455.1

C 316.3 315.9 315.8

DO% 88.3 86.0 85.5

DO% 10.21 9.84 9.80

pH 7.88 7.85 7.82

ORP 17.2 18.1 19.3

Turbidity 1.19 0.87 0.99

Air Temp °F 35°F 35°F 35°F

1344 arrive at MST090

Time 1345

H₂O Temp 9.4°C pH 7.91

Sp C 394.0 ORP 16.3

C 276.9 Turbidity 0.55 ntu

DO% 84.6% Air Temp 35°F

DO mg/L 9.52

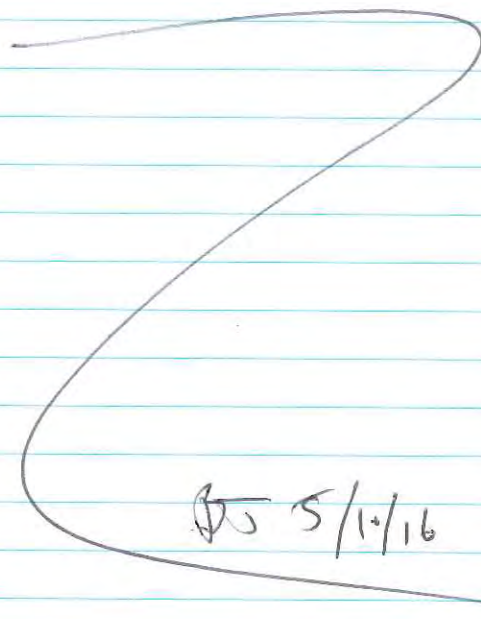
5/10/16

1435 Arrive @ MST096
 Time 14:40 DO% 108.7
 H₂O Temp °C 13.2 DO mg/L 11.29
 SpC 664 PH 8.38
 C 514 ORP 10.8
 Turbidity 2.28 Air Temp °F 35

15:10 Arrive @ MSG004
 Time 15:15 DO% 105.5%
 H₂O Temp °C 8.8°C DO mg/L 11.92
 SpC 648.6 pH 8.12
 C 447.3 ORP 17.6
 Turbidity 3.92 Air Temp 35°F

	Sample 1	Sample 2	Sample 3
Time	15:45	15:50	15:55
H ₂ O Temp °C	7.1	7.1	7.0
SpC	675.5	673.3	671.6
C	444.5	442.2	447.1
DO%	72.0	66.0	62.5
DO mg/L	8.45	7.87	7.51
PH	7.45	7.86	7.79
ORP	18.6	19.8	20.9
Turbidity	0.19	0.20	0.16
Air Temp	35°F	35°F	35°F

1620 Arrive at MST094
 Time 1627 DO% 74.3%
 H₂O Temp 11°C DO mg/L 8.05
 SpC 330.0 pH 7.84
 C 241.6 ORP 20
 Turbidity 0.65 ntu Air temp 35°F
 1700 Sign out at mine office



JS 5/10/16

5/11/16

Spring Sampling

0615 Calibrate YSI hand held

H₂O Temp 14.3°C

SpC 1782 after cal

C 1305 before calc / 1409 after

pH 4 4.01 before calc / 4.0 after

7 7.05 before calc / 7.00 after

10 9.95 before calc / 10.0 after

DO @ Bar. Pres 30.30 - 8.20 after calc

ORP @ 15°C - reading 238.5 - 241 after

- calibration complete

0815 Drop 2 sample coolers off
For pick up (FedEx) at the Monsanto
warehouse.

0840 sign into motor office

0900 inventory new shipment of
samples

1000 Arrive at MSG007

Time 1005

Air Temp 43°F

H₂O Temp 6.3°CDO_{mg/L} 3.4

SpC 634.3

pH 8.00

C 408.2

ORP 5.6

DO% 27.8

Turbidity 0.70 NTU

5/11/16

1020 Arrive at MSG006

Time 10:25

Air Temp 43°F

H₂O Temp 7.2°CDO_{mg/L} 7.91

SpC 1708

pH 7.50

C 1125

ORP 12.8

DO% 65.9%

Turbidity 0.90 NTU

11:10 Arrive at MST095

Time 11:20

Air Temp 43°F

H₂O Temp 11.8°CDO_{mg/L} 8.15

SpC 945

pH 7.88

C 707

ORP 17.7

DO% 77.0

Turbidity 0.39 NTU

11:57 Arrive at MST069

Time 12:15

Air Temp 43°F

H₂O Temp 10.4°CDO_{mg/L} 8.03

SpC 1563

pH 7.51

C 1129

ORP 44.7

DO% 72.3

Turbidity 0.36 NTU

12:50 Arrive at MBW135

Sounder not working move to next
site

5/11/16

B. Jones
T. Osborn

1330 Arrive at MST020

Time	13:35	DO %	9.66
H ₂ O Temp	8.4°C	pH	8.27
SpC	454.7	ORP	22.3
C	310.2	Turbidity	19.6 NTU
DO%	82.2	Air Temp °F	43°F

1420 Arrive at MST066

Time	1425	DO %	10.54
H ₂ O	18.1°C	pH	8.33
SpC	581	ORP	27.5
C	504	Turbidity	1.87
DO%	111.3	Air Temp °F	43°F

1530 Arrive at MST067

Time	1535	DO %	7.05
H ₂ O Temp °C	8.3°C	pH	8.10
SpC	2354	Turbidity	7.22 NTU
C	1602	ORP	42.0 mV
DO%	60.8	Air Temp °F	43°F

1600 Arrive at MST063

Time	1620	DO %	0.43
H ₂ O Temp °C	12.6	pH	7.60
SpC	649.5	Turbidity	14.2 NTU
C	495.5	ORP	-19.7 mV
DO%	3.8	Air Temp °F	51°F

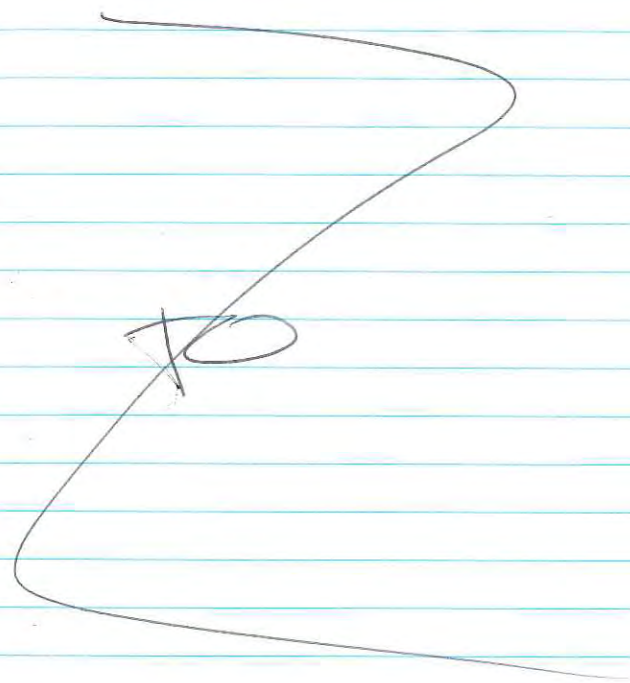
5/11/16

T. Osborn
B. Jones

17:10 Arrive at MST057

Time	1715	DO %	7.10
H ₂ O Temp °C	16.7°C	pH	8.04
SpC	412.8	ORP	11.5
C	347.2	Turbidity	0.98
DO%	73.0	Air Temp °F	51°F

1800 Sign out at mine office



5/12/16

Monsanto
Spring SamplingB. Jones
T. Osborn~~0620~~ 0620!

Pre cal readings:	w/ solution	After CAL
deg. C: 16.0		16.0°C
D.O. %: 85.4	@ 3030 Bar. Pres.	81.2
D.O.: 8.45		8.16
SPC: 2.2		1691
C: 1.7	1537 @ 16.3°C	1409
pH: 7.70	@ 16.1°C	pH 4 - 4.67 → 3.99 pH 7 - 6.78 - No Calc needed pH 10 - 9.96 - 10.01
ORP: 116.4	@ 16.5°C - cal to 241	241

- YSI Professional Plus handheld

Serial # 11E100485

- Cal complete @ 0700

- Drop off samples @ Lab 8:20 am

- 840 sign into mine office

- 900 arrive at for shop get more
sample bottles

0930 punch MG 135 & my

1045 arrive at MST045

Time	Sample 1 1100	Sample 2 1105	pH	Sample 1 8:02	Sample 2 8:02
Water Temp °C	11.6°C	11.6°C	ORP	38.7	38.2
Sp C	693	693	Turbidity	1.08	1.40
C	515	516	Air Temp	53°F	53°F
DO %	89.0	89.1			
DO mg/L	9.62	9.68			

5/12/16

Monsanto
Spring Sampling

11:55 Arrive @ MST044

Time 12:05	DO %	9.98
Water Temp °C 13.5°C	pH	8.17
Sp C 699	ORP	38.6
C 545	Turbidity	1.33
DO % 95.7	Air Temp °F	53°F

12:45 Arrive @ MST034

Time 1300	DO %	34.6
Water Temp °C 17.5°C	pH	7.54
Sp C 1040	ORP	23.0
C 891	Turbidity	0.55
DO % 36.7	Air Temp °F	53°F

1355 Arrive at MST051

Site was DRY no sample taken

1440 arrive at MST136

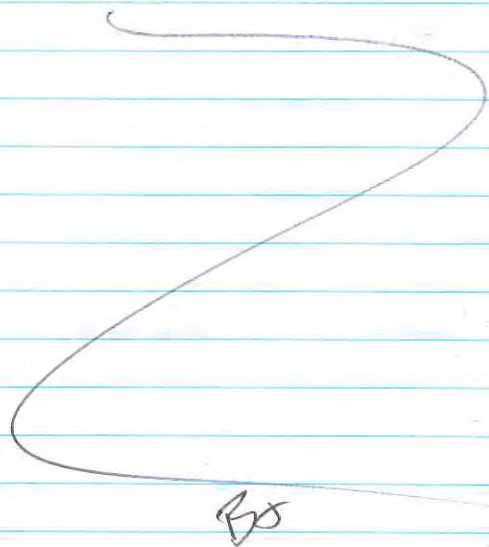
Time 1445	DO %	3.90
Water Temp °C 18.3°C	pH	7.49
Sp C 391.6	ORP	29.4
C 343.3	Turbidity	6.59
DO % 42.7	Air Temp °F	61°F

1550 Arrive at MST275

Time 15:55	DO %	6.77
Water Temp °C 21.6°C	pH	7.55
Sp C 109.9	ORP	43.6
C 102.9	Turbidity	45.5
DO % 78.0	Air Temp °F	61°F

1630 Arrive at MST226

	Sample 1	Sample 2	Sample 3
Time	1650	1655	1700
Water Temp °C	7.4°C	7.4°C	7.4°C
Sp C	353.4	353.5	353.8
C	235.2	234.6	234.9
DO%	80.6	75.2	74.8
DO mg/L	9.44	8.94	8.84
pH	7.26	7.16	7.04
ORP	58.4	60.7	63.8
Turbidity NTU	2.64	0.92	0.62
Air Temp °F	63°F	63°F	63°F



Bx

5/13/16

Monsanto
Spring Sampling

0625!

Precalc readings:

17.4°C / 78.1 DO% / 7.61 DO mg/L /
 10.6 spc / 8.9 C / 7.81 pH / -84.8 pV nV /
 64.4 ORP

Calibration:

Before

After

pH-4: @ 18.5°C 3.97 3.99
 -7 @ 19.0°C 6.98 No cal needed
 -10 @ 19.3°C 9.97 No cal needed
 C: @ 19.1°C 148 1409
 ORP: @ 18.0°C 234 228.5
 DO @ 23.9°C 74.2% 78.5%
 6.49 7.10

Bcr. ~~320~~ 30.20

-CAL complete 0700

0820 sign into mine office change out
 radios

0910 Arrive @ MST132 Air Temp

	0915 Sample 1 DO % / C	Sample 2 0920
Time	0915	0920
Water Temp °C	7.8°C	7.8°C
Sp C	309.0	308.0
C	205.8	203.7
DO%	71.5	71.6
DO mg/L	9.33	9.33
pH	7.85	7.85
ORP	55.0	54.6
Turbidity	5.91	5.63

5/13/16

T. Osborn
B. Jones

0945 arrive @ MST 131
 Time 0950 DO % 9.55
 H₂O Temp °C 7.5 pH 7.99
 Sp C 377.3 ORP 46.7
 C 266.0 Turbidity NTU 10.1
 DO % 80.4 Air Temp °F 50°F

1015 arrive @ MST 128
 Time 1020 DO % 9.15
 Water Temp °C 9.7°C pH 8.00
 Sp C 446.0 ORP 41.3
 C 315.6 Turbidity 4.50 NTU
 DO % 81.8 Air Temp 50°F

1130 Arrive @ MST 143
 Time 1135 DO % 8.31
 Water Temp °C 11.3 pH 7.60
 Sp C 134.6 ORP 41.8
 C 103.0 Turbidity 18.4
 DO % 76.0 Air Temp °F 50°F

1215 arrive @ MST 274
 Time 1230 DO % 9.14
 H₂O Temp 12.3°C pH 7.91
 Sp C 554.3 ORP 29.1
 C 419.6 Turbidity 7.48 NTU
 DO % 86.4 Air Temp 50°F

T. Osborn
B. Jones

5/13/16

1320 Arrive at MST 133
 Time 1325 DO % 7.77
 H₂O Temp °C 18.6°C pH 7.88
 Sp C 299.9 ORP 26.5
 C 263.3 Turbidity 16.2 NTU
 DO % 84.5 Air Temp °F 50°F

1420 Arrive at MST 144
 Time 1425 DO % 6.18
 Water Temp °C 11.1°C pH 7.57
 Sp C 791 ORP 42.7
 C 581 Turbidity 13.4 NTU
 DO % 57.0 Air Temp °F 50°F

~~Time TO~~

1450 Arrive @ MDS 025
 Time 1455 DO % 5.74
 H₂O Temp °C 11.0°C pH 7.06
 Sp C 1333.0 ORP 28.2
 C 977.0 Turbidity 12.4 NTU
 DO % 53.3 Air Temp °F 50°F

1530 arrive @ MST 269
 ← DRY — NO Sample

5/14/16

Monsanto
Spring SamplingT. Osborn
B. Jones
E. Yeager

GG152 YSI Professional Plus

- Serial #: 11E100485

- Precalc Readings

18.6°C / 82.0% D.O. / 7.69 DO / 5.5 SPC

4.8 Cond. / 7.33 pH / -54.8 pH mV

19.6 ORP

- CAL:

Pre

Post

pH-4 @ 20.9°C 3.99 No CAL Needed

-7 @ 21.0°C 6.98 No CAL Needed

-10 @ 20.9°C 10.01 NO CAL Needed

Cond @ 20.9°C 1483 1409 $\mu\text{S/cm}$

ORP @ 20.4°C 223.7 228.5 mV

D.O. @ 17.2°C 81.2% 7.83 mg/L 80.0% 7.64 mg/L

- 30.10 $\mu\text{S/cm}$ Hg in

- CAL Complete

0945 Arrive @ MBW152 baseline
is Dry

1040 arrive @ MBW087

Time 1145 pH 6.75

H₂O level 1.6 ORP 56.3

purge Rate 0.125 DO 0.47

Cumulative Vol 8.55L SpC 584.5

Temp 5.9°C Turbidity 9.0 NTU

Turbidity did not go below 5 NTU's
pumped for 1 hr and sampled

5/14/16

1220 Arrive @ MBW085

Time 1307 pH 6.86

H₂O level 8.5' ORP 64.7

purge rate 0.5L DO% 7.17

Cumulative Vol 14.5L SpC 364.1

Temp H₂O °C 5°C Turbidity 3.16

1410 Arrive @ MBW130

1425 pumped DRY

1500 Arrive @ MBW048

Time 1613 pH 6.59

H₂O level 1.10 ORP 4.8

Purge Rate 0.085L/min DO 0.42

Cumulative Vol 7.8L SpC 194.7

Temp H₂O °C Turbidity 2.96 NTU

1640 Arrive @ MBW131

Time 1755 pH 6.5

H₂O level 1.50 ORP 71.8

purge rate 0.07 DO% 7.12

Cumulative Vol 5.9L SpC 166.5

Temp H₂O °C 6.2°C Turbidity 4.25

1835 Arrive @ MBW135

Time 1840 pH 7.04

H₂O level 1.6 ORP 63

purge rate 0.1L/min DO 1.60 mg/L

Cumulative Vol NA SpC 449.3

Temp H₂O 6.8°C Turbidity 4.11

5/15/16

Spring Sampling

0615: CAL YSI Professional Handheld

- Serial # 11E100485

CAL	Before	After
pH: 4 @ 20.6°C 4.00	No CAL needed	
7 @ 20.9°C 7.00	No CAL needed	
10 @ 21.2°C 10.2	No CAL needed	
Cond: @ 20.7°C 1405 μ S/cm	1409 μ S/cm	
ORP: @ 20.7°C 226.0 mV	228.5 mV	
DO: @ 22.3°C 76.9%	77.5%	
- 29.9 mHg Br	6.72 μ L	6.78

- CAL complete

0810 Sign in at mine office

0840 arrive @ MBW0130

0850 Sample time

WL 3.5' bags DO mg/L 4.35

Purge rate 0.46 L/min SC μ S/cm 212.1

T 6°C Turb NTU 63.7

pH 7.17

ORP/EH 63.1

0900 arrive @ MBW027

0910 1030 sample time

WL 6.3' bags pH 5.9

Purge rate 0.2 L/min ORP/EH mV 73.5

cumul. purge 2.70 L DO mg/L 5.52

T 5.9°C SC μ S/cm 903

Turb 1.36 NTU

05/15/16 (2) cont.

1035 arrive at MBW028

1113 pump dry

1130 recharge to 80% sample 3.9

T°C 6.6 DO mg/L 0.93

pH 6.74 SC μ S/cm 1334

ORP EH/mV 78.2 Turb NTU 11.5

1140 arrive @ MBW011

WL recharge 80% to 3' bags

1230 Sample

T°C 5.7 DO mg/L 3.03

pH 6.95 SC μ S/cm 784.6

ORP EH/mV 82.1 Turb NTU 4.17

1304 arrive at MBW009

1340 Sample time

WL 3.70' bags ORP EH mV 60.4

Purge rate 0.12 L/min DO mg/L 0.62

cumul. purge vol. 3.6 L SC μ S/cm 1043

T°C 7.5 Turb NTU 0.55

pH 6.75

05/10/16

Saw W at mine office 0730

Q&A from at hearing to start

Recall for Vance

0920 Finish Recall + GPS Tracking



A-2 2016 Fall Surface Water Sampling

TABLE A-3
2016 FALL SURFACE WATER FIELD PARAMETERS
P4 MONSANTO, IDAHO

(Page 1 of 1)

Matrix	Station ID	Water Temp (deg. C)	Spec Cond (uS/cm) @ 25 deg. C	Cond (uS/cm)	D.O. (% sat.)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Air Temp (deg. c)	Discharge (cfs)	Comments	Date	Time
SW	MDS025	DRY											9/27/2016	1145
SW	MDS026	7.8	1636	1100	N/A	N/A	7.99	50.4	74.5	16		Flow can not be measured, seeping from area approximately 30 feet wide along hillside. Daylights in several areas.	9/27/2016	1045
SW	MDS030	18.4	5.6	5	N/A	N/A	8.49	73.5	1.87	20		Flowing out of toe of hillside approximately 3 feet wide. Can not collect flow, seeping in several locations.	9/27/2016	1440
SW	MDS034	DRY											9/27/2016	1212
SW	MSG004	DRY											9/27/2016	1504
SW	MST019	14.7	331	267.8	N/A	N/A	9.31	58.2	3.14	21	57	flow taken from USGS station, staff gauge 1.90.	9/27/2016	1720
SW	MST020	14	314.6	249.9	N/A	N/A	9.26	61.3	14.7	23	57	flow taken from USGS station, staff gauge 1.90.	9/27/2016	1755
SW	MST044	14.5	751	600	N/A	N/A	9.16	41.9	1.3	19	3.26		9/27/2016	1245
SW	MST045	17.2	767	652	N/A	N/A	9.21	54.2	1.55	19	4.15		9/27/2016	1340
SW	MST069	12.8	1636	1253	N/A	N/A	8.81	60.9	8.51	23		Flow very low in tall grass, can not isolate channel to collect flow.	9/27/2016	1640
SW	MST144	DRY											9/27/2016	1135
SW	NWPond	23.9	4.5	4.3	N/A	N/A	9.62	652	149	23		Pond sample, no flow.	9/27/2016	1545
SW	SEPond	23	163.9	157.3	N/A	N/A	9.96	60.6	517	23		Pond sample, no flow.	9/27/2016	1615

cfs	cubic feet per second	NTU	Nephelometric Turbidity Units
deg. C	degrees Celsius	N/A	Parameter not collected due to meter malfunction
g/L	grams per liter	SW	Surface Water
mg/l	milligrams per liter	uS/cm	microSiemens per centimeter
mV	millivolts	% sat.	percent saturation

2016 Fall Surface Water Sampling Field Forms

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 27 / 2016 Arrival Time 1145

Field Personnel

Emily Yeager Signatures
Tom Osborn Aaron Pettley

SITE DESCRIPTION

Station Name West Dump Seep Station Number MDS025

Latitude On File Longitude On File

Elevation On File Datum NAD 27 Photo Number 3

Site & Stream Description

Surface Water Characteristics (color, odor, appearance):

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: Sample Time:

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 28 2016

Time 145

Station Number MD5025

Completed by: E.Yeager T. Osborn A. Pettley Checked by: E.Yeager T. Osborn

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDx2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 10²⁸ 2016 Arrival Time 1640

Field Personnel

Emily Yeager

Signatures

[Signature]

Tom Osborn Aaron Pettley

SITE DESCRIPTION

Station Name WEST DUMP SEEP Station Number MDS026

Latitude On File Longitude On File

Elevation On File Datum NAD 27 Photo Number 1

Site & Stream Description seeping from hillside into
grassy area

Surface Water Characteristics (color, odor, appearance): no odor, clear
with some suspended material

SAMPLE COLLECTION

Collection Method: 1L bottle Horizontal-bottle, Swing-sampler, Other() Up-stream / Across-stream

Sample ID: 1609^{SW}MDS026-U,F Sample Time: 1645

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1645		
Water Temperature (°C)	7.8		
Specific Conductivity (µS/cm) @ 25° C	1636		
Conductivity (µS/cm)	1160		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	NA		
Dissolved Oxygen (mg/L)	NA		
pH	7.99		
ORP (mV)	50.4		
Turbidity (FTU)	74.5		
Air Temperature (°C) °F	60°F		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 28th 2016 Time 1040 Station Number MD5026

Completed by: E.Yeager T. Osborn *A. Petty* Checked by: E.Yeager T. Osborn *A. Petty*

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDX2)

Distance from Reference	Depth of Velocity Measurement			Distance from Reference (or N/A)	Depth of Velocity Measurement		
	<u>0.2</u>	<u>0.6</u>	<u>0.8</u> (circle)		<u>0.2</u>	<u>0.6</u>	<u>0.8</u> (circle)
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Flow can't be measured, seeping from area apx 30ft wide along hillside. Daylights in several locations.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 27 / 2016 Arrival Time 1430

Field Personnel

Emily Yeager Signatures
Tom Osborn Aaron Petley

SITE DESCRIPTION

Station Name Pit #2 upper dump seep Station Number MDS030

Latitude On File Longitude On File

Elevation On File Datum NAD 27 Photo Number 7

Site & Stream Description low flow, seeping from toe of dump

Surface Water Characteristics (color, odor, appearance): yellowish tint, low flow, muddy pools

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: 1609SWMDS030-U,F Sample Time: 1440

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1440		
Water Temperature (°C)	18.4		
Specific Conductivity (µS/cm) @ 25° C	5.6		
Conductivity (µS/cm)	5.0		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	NA		
Dissolved Oxygen (mg/L)	NA		
pH	8.49		
ORP (mV)	73.5		
Turbidity (FTU)	1.87		
Air Temperature (°C) or (°F)	68		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 27th 2016

Time 1430

Station Number MD5030

Completed by: E.Yeager T. Osborn *A. Petty*

Checked by: E.Yeager T. Osborn *A. Petty*

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDx2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Flowing out of toe of hillside appx 3-ft wide. Can't collect flow, seeping in several locations

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 28 / 2016 Arrival Time 1212

Field Personnel

Emily Yeager Signatures _____
Tom Osborn Aaron Pettley _____

SITE DESCRIPTION

Station Name Henny mine Dump seep #3 Station Number MP5034

Latitude On File Longitude On File

Elevation On File Datum NAD 27 Photo Number 4

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: _____ Sample Time: _____

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 28 / 2016 Time 1212 Station Number MDS034

Completed by: E.Yeager T.Osborn A. Pettley Checked by: E.Yeager T.Osborn _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDX2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 27 / 2016 Arrival Time 1504

Field Personnel

Emily Yeager _____ Signatures _____
Tom Osborn Aaron Pettley _____

SITE DESCRIPTION

Station Name Holmgren Spring Station Number MSG004
Latitude On File Longitude On File
Elevation On File Datum NAD 27 Photo Number 8

Site & Stream Description _____

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: _____ Sample Time: _____

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 28 / 2016

Time 1504

Station Number MS6004

Completed by: E.Yeager T.Osborn

Checked by: E.Yeager T.Osborn

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. **ft** **L.E.W.** **ft** **Total Width** **ft**

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDX2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 27 / 2016 Arrival Time 1710

Field Personnel

Emily Yeager Signatures _____
Tom Osborn Aaron Pettley _____

SITE DESCRIPTION

Station Name Blackfoot River Below Ballard Creek Station Number MST019

Latitude On File Longitude On File

Elevation On File Datum NAD 27 Photo Number 12

Site & Stream Description Free flowing, gravel bottom

Surface Water Characteristics (color, odor, appearance): no color, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other (Kemmerer). Up-stream / Across-stream

Sample ID: 11609SWMST019 - U, F + DUP Sample Time: 1720

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1720	1720	
Water Temperature (°C)	14.7	14.8	
Specific Conductivity (µS/cm) @ 25° C	331.0	330.4	
Conductivity (µS/cm)	267.8	267.5	
TDS (g/L)	—	—	
Dissolved Oxygen (% sat.)	NA	NA	
Dissolved Oxygen (mg/L)	NA	NA	
pH	9.31	9.31	
ORP (mV)	58.2	58.2	
Turbidity (FTU)	3.14	3.14	
Air Temperature (°C) °F	70	70	

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 28 / 2016

Time 1700

Station Number MST019

Completed by: E. Yeager T. Osborn

Checked by: E. Yeager T. Osborn

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDX2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Uses stream gauge station, flow will be verified on line. Staff gauge 1.90

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 27 / 2016 Arrival Time 1745

Field Personnel

Emily Yeager _____ Signatures _____
Tom Osborn Aaron Pettley _____

SITE DESCRIPTION

Station Name Blackfoot River below state land creek Station Number MST020

Latitude On File Longitude On File

Elevation On File Datum NAD 27 Photo Number 13

Site & Stream Description appx 2.0' deep, free flowing, silty bottom with vegetation

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other (Kemmerer). Up-stream / Across-stream

Sample ID: 16095NMST020-UF Sample Time: 1755

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1755		
Water Temperature (°C)	14.0		
Specific Conductivity (µS/cm) @ 25° C	314.6		
Conductivity (µS/cm)	249.9		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	— nA		
Dissolved Oxygen (mg/L)	— nA		
pH	9.26		
ORP (mV)	61.3		
Turbidity (FTU)	14.7		
Air Temperature (°F)	73		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09/27/2016

Time 1755

Station Number MST020

Completed by: E. Yeager T. Osborn

Checked by: E. Yeager T. Osborn

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDX2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Use Flow from MST019 USGS Stream gauge station.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 27 / 2016 Arrival Time 1225

Field Personnel

Emily Yeager _____ Signatures _____
~~Tom Osborn~~ A. Pettley _____

SITE DESCRIPTION

Station Name Immediately below Henry Mine Station Number MST 044
 (1997#24)

Latitude On File Longitude On File

Elevation On File Datum NAD 27 Photo Number 5

Site & Stream Description Clear free flowing gravel
bottom

Surface Water Characteristics (color, odor, appearance): clear, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other() Up-stream / Across-stream

Sample ID: 110096WIMST044-U,F Sample Time: 1245

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1245		
Water Temperature (°C)	14.5		
Specific Conductivity (µS/cm) @ 25° C	751		
Conductivity (µS/cm)	600		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	NA		
Dissolved Oxygen (mg/L)	NA		
pH	9.16		
ORP (mV)	41.9		
Turbidity (FTU)	1.3		
Air Temperature (°C or °F)	66		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 27 / 2016

Time 1240

Station Number MST044

Completed by: E. Yeager T. Osborn *A. Pettley*

Checked by: E. Yeager T. Osborn

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. 10.9 ft L.E.W. 0.8 ft Total Width 11.3 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDX2)

LEW

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
0.8	1	0.3	0.02	8.3	16	0.85	0.60
1.3	2	0.5	0.14	8.8	17	1.0	0.31
1.8	3	0.6	0.14	9.3	18	0.9	0.28
2.3	4	0.65	0.02	9.8	19	0.8	-0.02
2.8	5	0.65	0.17	10.3	20	0.6	-0.02
3.3	6	0.65	0.29	10.8	21	0.3	0.08
3.8	7	0.75	0.06				
4.3	8	0.75	0.29				
4.8	9	0.6	0.64				
5.3	10	0.65	1.13				
5.8	11	0.8	0.86				
6.3	12	0.9	1.24				
6.8	13	0.95	0.64				
7.3	14	0.9	0.73				
7.8	15	0.6	0.93				

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / ²⁷~~28~~ / 2016 Arrival Time 1321

Field Personnel

Emily Yeager _____ Signatures _____
Tom Osborn A. Pettley _____

SITE DESCRIPTION

Station Name Little Blackfoot River above Henry Creek Station Number MST045

Latitude On File Longitude On File

Elevation On File Datum NAD 27 Photo Number 6

Site & Stream Description free flowing, silty bottom with a lot of vegetation growth

Surface Water Characteristics (color, odor, appearance): yellowish color, no odor

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: 1609SWMST045-U,F Sample Time: 1340

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1340		
Water Temperature (°C)	17.2		
Specific Conductivity (µS/cm) @ 25° C	767		
Conductivity (µS/cm)	652		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	NA		
Dissolved Oxygen (mg/L)	NA		
pH	9.21		
ORP (mV)	54.2		
Turbidity (FTU)	1.55		
Air Temperature (°C / °F)	68		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 28 / 2016

Time 1330

Station Number MST045

Completed by: E.Yeager A. Pettit
T.Osborn

Checked by: E.Yeager A. Pettit
T.Osborn

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

TW 11.6'

R.E.W. 27.7 ft L.E.W. 16.1 ft Total Width 27.8 ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDX2)

LEW

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
16.1	1	0.20	-0.04	26.6	16	0.90	0.13
16.8	2	0.75	0.26	27.3	17	0.90	0.08
17.5	3	0.80	-0.08	27.7	18	0.70	0.17
18.2	4	1.10	0.62				
18.9	5	1.20	0.05				
19.6	6	1.20	0.30				
20.3	7	1.15	0.11				
21.0	8	1.15	0.66				
21.7	9	1.75	0.18				
22.4	10	1.40	0.10				
23.1	11	1.175	0.88				
23.8	12	1.80	0.61				
24.5	13	1.85	0.46				
25.2	14	1.60	0.33				
25.9	15	1.05	0.33				

REW

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 27 / 2016 Arrival Time 1128

Field Personnel

Emily Yeager Signatures
Tom Osborn Aaron Pettley

SITE DESCRIPTION

Station Name Short creek below Ballard Mine Station Number MST069

Latitude On File Longitude On File

Elevation On File Datum NAD 27 Photo Number 11

Site & Stream Description Very low flow, tall grass
choking out stream

Surface Water Characteristics (color, odor, appearance): clear, low flow
very shallow

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: 1609 SW MST069-1, F + MS/MSD Sample Time: 1640

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1640	1640	1640
Water Temperature (°C)	12.8	12.7	12.6
Specific Conductivity (µS/cm) @ 25° C	1636	1643	1645
Conductivity (µS/cm)	1253	1257	1257
TDS (g/L)	—	—	—
Dissolved Oxygen (% sat.)	NA	NA	NA
Dissolved Oxygen (mg/L)	NA	NA	NA
pH	8.81	8.69	8.70
ORP (mV)	60.9	63.5	62.4
Turbidity (FTU)	8.51	8.50	8.51
Air Temperature (°C)	73	73	73

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 27 2016

Time 1628

Station Number MST069

Completed by: E. Yeager T. Osborn A. Pettay

Checked by: E. Yeager T. Osborn A. Pettay

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDx2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Flow very low in tall grass, can not isolate channel to collect flow.

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 28 / 2016 Arrival Time 1135

Field Personnel

Emily Yeager _____ Signatures _____
~~Tom Osborn~~ Aaron Pettley _____

SITE DESCRIPTION

Station Name West Pond Creek headwaters below west pond Station Number MST144

Latitude On File Longitude On File

Elevation On File Datum NAD 27 Photo Number 2

Site & Stream Description Dry

Surface Water Characteristics (color, odor, appearance): Dry

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(). Up-stream / Across-stream

Sample ID: _____ Sample Time: _____

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time			
Water Temperature (°C)			
Specific Conductivity (µS/cm) @ 25° C			
Conductivity (µS/cm)			
TDS (g/L)			
Dissolved Oxygen (% sat.)			
Dissolved Oxygen (mg/L)			
pH			
ORP (mV)			
Turbidity (FTU)			
Air Temperature (°C)			

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 28 2016

Time 1135

Station Number MST144 ADS025

Completed by: E.Yeager T.Osborn A. Pettley

Checked by: E.Yeager T.Osborn A. Pettley

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. ft L.E.W. ft Total Width ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDX2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

SURFACE WATER SAMPLE COLLECTION FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 27 / 2016 Arrival Time 1540

Field Personnel

Emily Yeager _____ Signatures _____
Tom Osborn _____ Aaron Pettley _____

SITE DESCRIPTION

Station Name NW Pond next to MBW131 Station Number NWPOND

Latitude On File Longitude On File

Elevation On File Datum NAD 27 Photo Number 9

Site & Stream Description cattle pond, 30ft x 20ft
no flow in or out, stagnant water.

Surface Water Characteristics (color, odor, appearance): _____

SAMPLE COLLECTION

Collection Method: 1L bottle, Horizontal-bottle, Swing-sampler, Other(____). Up-stream / Across-stream

Sample ID: NWPOND-U, F Sample Time: 1545

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	1545		
Water Temperature (°C)	23.9		
Specific Conductivity (µS/cm) @ 25° C	4.5		
Conductivity (µS/cm)	4.3		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	— NA		
Dissolved Oxygen (mg/L)	NA		
pH	9.42		
ORP (mV)	65.2		
Turbidity (FTU)	149		
Air Temperature (°C)	73		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 28th 2016 Time _____ Station Number _____

Completed by: E.Yeager T.Osborn _____ Checked by: E.Yeager T.Osborn _____

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0

Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDX2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Field Measurements			
Parameter	Sample 1	Sample 2	Sample 3
Time	11:15		
Water Temperature (°C)	23.0		
Specific Conductivity (µS/cm) @ 25° C	1163.9		
Conductivity (µS/cm)	157.3		
TDS (g/L)	—		
Dissolved Oxygen (% sat.)	— NA		
Dissolved Oxygen (mg/L)	NA		
pH	9.96		
ORP (mV)	60.6 104.6		
Turbidity (FTU)	517		
Air Temperature (°C) °F	73		

SURFACE WATER FLOW MEASUREMENT FORM

Project P4 Production SE Idaho Mine-Specific Se Program – Fall 2016 SW Sampling

Date 09 / 28 / 2016 Time _____ Station Number _____

Completed by: E.Yeager T.Osborn Checked by: E.Yeager T.Osborn

Flow by Capture Method

Measurement Number	Time (sec)	Volume (L)

Flow by Meter

R.E.W. _____ ft L.E.W. _____ ft Total Width _____ ft

Number of Subsections Based on Stream Width		
Total Width (ft)	Number of Subsections	Subsection Width (ft)
<2	8 - 10	0.2 - 0.3
2 - 4	10 - 12	0.3 - 0.4
4 - 10	12 - 15	0.4 - 0.7
10 - 20	15 - 20	0.7 - 1.0
>20	20 - 25	1.0 - 2.0


Depth of Velocity Measurement (Ft. Below Surface)

Total Depth (TD): <2.0ft : 0.6TD (standard setting rod); >2.0ft : 0.2TD = (TD/2) and 0.8TD = (TDX2)

Distance from Reference	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)			Distance from Reference (or N/A)	Depth of Velocity Measurement 0.2 0.6 0.8 (circle)		
	Subsection No.	Subsection Depth (ft)	Velocity (30 sec)		Subsection No. (or N/A)	Subsection Depth (ft)	Velocity (30 sec)
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:		Page: <u>1</u> of <u>2</u>
Company:	MNH	Report To:	Molly Prickett	Attention:	Molly Prickett	REGULATORY AGENCY <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER _____
Address:	2800 E. Cottonwood Pl	Copy To:		Company Name:	Monsanto	
	Suite 300 SLC UT 84121			Address:		
Email To:		Purchase Order No.:		Pace Quote Reference:		
Phone:	801 617 3200	Project Name:	Monsanto Fall 2010	Pace Project Manager:		
	Fax: —	Project Number:	rev 10	Pace Profile #:		Site Location STATE: _____
Requested Due Date/TAT: standard						

[illegible]

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS				Temp in °C	Received on Ice (Y/N)	Custody (Y/N)	Sealed Cooler (Y/N)	Samples Intact (Y/N)
Monsanto CERCLA Date: 28Sep16 Wgt: 50.45 LBS DV:	E. Yeager / MWH	9/28/16	1000	Fedex											

SHIPPING: 0.00
SPECIAL: 0.00
HANDLING: 0.00
TOTAL: 0.00

Date: 28Sep16
Wgt: 50.45 LBS
DV:

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: E. Yeager A. Pettit
SIGNATURE of SAMPLER: 

DATE Signed (MM/DD/YY): 09/27/16

Svcs: STANDARD OVERNIGHT
TRCK: 9723 6785 8271

ing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.08, 12-Oct-2007



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	MNUH	Report To:	Molly Pickett	Attention:	Molly Pickett
Address:	2945 CHANDLER BLVD FAIRFAX 300 S.W. 1ST 84121	Copy To:		Company Name:	MONTAÑO
Email To:		Purchase Order No.:		Address:	
Phone:	8016173200	Project Name:	MONTAÑO Fall 2010	Pace Quote Reference:	
Fax:		Project Number:	CERCLA	Pace Project Manager:	
Requested Due Date/TAT:	Standard			Pace Profile #:	
				REGULATORY AGENCY	
				<input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER _____	
				Site Location	
				STATE:	

[illegible]

IZ	ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS				
								Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)	
		Eveager MWTH	9/22/16	1000	Fed EX							

SAMPLER NAME AND SIGNATURE	
PRINT Name of SAMPLER:	E. Veager A. R. H. H. A.
SIGNATURE of SAMPLER:	DATE Signed (MM/DD/YY): 9/27/16

FALL-Q-020rev.08, 12-Oct-2007

05/10/16

Saw W at mine office 0730
 0820 Arrive at highway to start
 Recon for Vance
 0920 Finish Recon + GPS Tracking



E. Yeager
 A. Petty

09/27/16

0630 leave SLC
 0935 sign in at mine office
 1040 arrive @ MDS026
~~1609 MDS026~~

1045 1609 SW MDS026 = U, F

parameters = pH 7.99 ^{temp} 7.8°C

NTU = 74.6, SPC 1636, Cond. 1100

ORP 50.4, D.O. N/A.

Took photo, Air temp = 60°F

Flow cannot be measured.

1145 At MST144, Dry.
took photo1145 At MDS025, "dump
seep DRY - Took
photo.1212 At MDS034 - Dry
Took photo.

1223 At MST044

H₂O T °C 14.5

pH 9.16

SL 751 μ Siemens ORP 41.9mVCond 600 μ S/cm

Turb 1.3 NTU

Air T 66°F

9/27/16

Monsanto
FALL 2016E. Yeager
A. Dittley
Sunny ~70°F1321 Arrived at MST045H₂O °C 17.2

ORP 54.2

SC µS/cm @ 25°C 767 TURB 1.55

Cond µS/cm 652 AIR T °F 68

pH 9.21

1340 Sample time

1430 Arrived at MD5030

1440 Sample time

H₂O °C 18.4

SC µS/cm @ 25°C 5.6

Cond µS/cm 5.0

pH 8.49

ORP 73.5 mV

TURB 1.87

AIR T °F 68

1504 Arrive @ MS66004 - DRY

1540 NW Pond in Ballard,

Recon Sample

1545 Sample time

H₂O °C 23.9

SC µS/cm @ 25°C 4.5 TURB 1.49

Cond µS/cm 4.3 AIR T °F 73

pH 9.62

ORP 65.2 mV

9/27/16

1600 Arrive SE Pond in Ballard,
Recon Sample

1615 Sample time

H₂O °C 23

SC µS/cm @ 25°C 163.9

Cond µS/cm 157.3

pH 9.94

ORP mV 60.6

TURB 517

AIR T °F 73

1628 Arrive @ MST0691640 Sample time + ~~DRY~~ MSJ/MSDH₂O °C 12.8 12.7 12.6

SC µS/cm @ 25°C 1634 1643 1645

Cond µS/cm 1253 1257 1257

pH 8.81 8.69 8.70

ORP mV 60.9 63.5 62.4

TURB 8.51 8.50 8.51

AIR T °F 73 73 73

1710 MST019 arrive + DRY

1720 Sample time

H₂O °C 14.7 14.8

SC µS/cm @ 25°C 331.0 330.4 58.2 58.2

Cond µS/cm 267.8 267.5 TURB 3.14 3.14

pH 9.31 9.31 AIR T °F 70 70

09/27/16

1745 Arrive MSTO20 Gate code 0110

1755 Sample

H₂O °C 14.0

EC µS/cm @ 25°C 314.6

Cond µS/cm 249.9

pH 9.26

ORP mV 61.3

TURB 14.7 ~~14.7~~

Airt °F 73

1830 Sign out at mine office

09/27/16
 [Signature]

APPENDIX B - 2016 SURFACE WATER AND GROUNDWATER ANALYTICAL DATA

B-1 2016 Surface Water and Groundwater Analyte List

B-2 Applicable or Relevant and Appropriate Requirements (ARARs)

B-3 2016 Surface Water Analytical Data

B-4 2016 Groundwater Analytical Data

B-1 2016 Surface Water and Groundwater Analyte List

**TABLE B-1
2016 SURFACE WATER AND GROUNDWATER
ANALYTE LIST**

Category	Fraction	Analytes (Analytical Method)
Surface Water		
Streams, Seeps, and Springs,	Unfiltered Filtered ^a Filtered Unfiltered Unfiltered	Se (EPA 6020A) Cd, Se, Ca, Mg (EPA 6020A) SO ₄ (EPA 300.0) TDS (SM2540C) Field Parameters ^b
Groundwater		
Monitoring Wells and Direct Push Borehole Wells ^c	Unfiltered ^d Filtered Filtered Unfiltered Unfiltered	Cd, Mn, Se (EPA 6020A) Se (EPA 6020A) SO ₄ (EPA 300.0) TDS (SM2540c) Field Parameters ^b
<p>Notes:</p> <p>^aHardness is calculated on filtered fractions of Ca and Mg</p> <p>^bField Parameters are listed on Table 3 and Table 5 of the <i>2014 Long-Term Surface Water and Groundwater Memo</i>.</p> <p>^cBorehole Monitoring Wells (direct push) are differentiated from "regular or standard" monitoring wells based on their methods and means of completion. In general, they have a smaller diameter and a shorter pre-packed screened interval than the regular monitoring wells.</p> <p>^dDirect-push monitoring wells may be sampled for dissolved or dissolved and total fractions depending on turbidity (see <i>2010 Groundwater SAP</i>).</p> <p>Ca - Calcium Cd - Cadmium Mg – Magnesium Mn – Manganese Se - Selenium SO₄ - Sulfate TDS - Total Dissolved Solids</p>		

B-2 2016 Screening Levels

**TABLE B-2
SCREENING LEVELS**

Analyte		GW Levels (mg/l)	Source ^a	SW Levels (mg/l)	Source ^{b, c}	Notes
Aluminum		0.2	Secondary MCL	0.087	NRWQC	aquatic life CCC
Antimony		0.006	Primary MCL	0.0056	IDAPA 58.01.02	human health w&o
Arsenic		0.01	Primary MCL	0.0062	USEPA ^d	human health o
Barium		2	Primary MCL	--		
Beryllium		0.004	Primary MCL	--		
Boron		--		--		
Cadmium		0.005	Primary MCL	0.0006	IDAPA 58.01.02	aquatic life CCC
Chloride		250	Secondary MCL	--		
Chromium		0.1	Primary MCL	0.011	IDAPA 58.01.02	aquatic life CCC
Cobalt		--		--		
Copper		1.3	Primary MCL	0.011	IDAPA 58.01.02	aquatic life CCC
Fluoride		4	Primary MCL	--		
Iron		0.3	Secondary MCL	0.3	NRWQC	organoleptic effects
Lead		0.015	Primary MCL	0.0025	IDAPA 58.01.02	aquatic life CCC
Manganese		0.05	Secondary MCL	0.05	NRWQC	human health
Mercury		0.002	Primary MCL	0.00077	NRWQC	aquatic life CCC
Molybdenum		--		--		
Nickel		--		0.052	IDAPA 58.01.02	aquatic life CCC
Nitrate		10	Primary MCL	--		
Nitrite		1	Primary MCL	--		
Selenium		0.05	Primary MCL	0.0031	NRWQC	aquatic life CCC
Silver		0.1	Secondary MCL	0.0034	IDAPA 58.01.02	aquatic life CCC
Sulfate		250	Secondary MCL	--		
TDS		500	Secondary MCL	--		
Thallium		0.002	Primary MCL	0.00024	IDAPA 58.01.02	human health w&o
Uranium		0.03	Primary MCL	--		
Vanadium		--		--		
Zinc		5	Secondary MCL	0.12	IDAPA 58.01.02	aquatic life CCC
pH		6.5-8.5	Secondary MCL	6.5-9	NRWQC	aquatic life CCC

Notes for Screening Levels

CCC chronic criteria
 GW groundwater
 MCL maximum contamination limit
 mg/L milligram per liter
 SW surface water

^a USEPA primary and secondary Maximum Contaminant Level (MCL), National Primary Drinking Water Regulations

^b State of Idaho Surface Water Quality for Aquatic Life (IDAPA 58.01.02); Chronic Criteria (CCC) or Water & Organisms (IDEQ, 2014)

^c National Recommended Water Quality Criteria (USEPA, 2015); Freshwater Standards for Chronic Criteria (CCC)

^d USEPA letter to IDEQ dated September 15, 2016 Re: EPA Dissapproval of Idaho's Arsenic Human Health Water Quality Criteria

B-3 2016 Surface Water Analytical Data

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS

P4 RI/FS

(Page 1 of 17)

Analyte (Units)	Location Identification	MDS030		MDS030 Dup		MDS030 Avg	
	Location Type Date Collected	Seep 5/10/2016		Seep 5/10/2016		Seep 5/10/2016	
	<u>Screening Levels</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)							
Cadmium	0.0006 mg/L	<0.00008	--	<0.00008	--	<0.00008	--
Calcium		156 D	--	164 D	--	160 D	--
Magnesium		17.8	--	18.3	--	18.05	--
Selenium	0.0031 mg/L	0.772 D	0.756 D	0.78 D	0.772 D	0.776 D	0.764 D
						--	--
Chemistry Parameters (mg/L)						--	--
Sulfate (as SO ₄)	--	141 DJ-	--	141 DJ-	--	141 DJ-	--
Total dissolved solids	--	--	578	--	565	--	571.5

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS

P4 RI/FS

(Page 2 of 17)

Analyte (Units)	Location Identification	MDS030		MSG004		MSG005	
	Location Type Date Collected	Seep 9/27/2016		Spring 5/10/2016		Spring 5/10/2016	
	<u>Screening Levels</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)							
Cadmium	0.0006 mg/L	<.00008	--	0.00004 FJ	--	<0.00008	--
Calcium		151 D	--	77 D	--	88.8 D	--
Magnesium		17.6	--	24.5 D	--	22.6 D	--
Selenium	0.0031 mg/L	1.02 D	1.01 DJ	0.0209	0.0217	0.0052	0.0057
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	--	169 D	--	37.6 J-	--	29.9 J-	--
Total dissolved solids	--	--	604	--	301	--	317

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS
P4 RI/FS
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Analyte (Units)	Location Identification		MSG006		MSG007		MST019	
	Location Type	Date Collected	Spring	5/11/2016	Spring	5/11/2016	Stream	5/9/2016
	<u>Screening Levels</u>		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)								
Cadmium		0.0006 mg/L	0.00002 FJ	--	<0.00008	--	0.000048 FJ	--
Calcium			244 D	--	65.3 D	--	61.5 D	--
Magnesium			43.3 D	--	17.8	--	10.8	--
Selenium		0.0031 mg/L	0.279	0.286	0.0139	0.0495	0.0057	0.0068
Chemistry Parameters (mg/L)								
Sulfate (as SO ₄)	--		518 DJ-	--	88.9 DJ-	--	9.4 J-	--
Total dissolved solids	--		--	1080	--	296	--	214

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS
P4 RI/FS
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Analyte (Units)	Location Identification	MST019		MST019 Dup		MST019 Avg	
	Location Type Date Collected	Stream 9/27/2016		Stream 9/27/2016		Stream 9/27/2016	
	<u>Screening Levels</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)							
Cadmium	0.0006 mg/L	<.00008	--	<.00008	--	<.00008	--
Calcium		55 D	--	55.1 D	--	55.05 D	--
Magnesium		12.6	--	12.8	--	12.7	--
Selenium	0.0031 mg/L	0.0018	0.0018 J	0.0017	0.0019 J	0.00175	.00185 J
		--	--			--	--
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	--	14.2	--	14.1	--	14.15	--
Total dissolved solids	--	--	218	--	211	--	214.5

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS
P4 RI/FS
 (Page 5 of 17)

Analyte (Units)	Location Identification		MST020		MST020		MST050	
	Location Type	Date Collected	Stream	5/11/2016	Stream	9/27/2016	Stream	5/9/2016
	<u>Screening Levels</u>		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)								
Cadmium	0.0006 mg/L		0.000014 FJ	--	<.00008	--	0.000052 FJ	--
Calcium			57.9 D	--	54.9 D	--	44.5 D	--
Magnesium			9.82	--	12.8	--	9.24	--
Selenium	0.0031 mg/L		0.0053	0.0057	0.0016	0.0017 J	0.00055	0.00075
Chemistry Parameters (mg/L)								
Sulfate (as SO ₄)	--		9.0 J-	--	13.7	--	12.5 J-	--
Total dissolved solids	--		--	223	--	205	--	195

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS
P4 RI/FS
(Page 6 of 17)

Analyte (Units)	Location Identification	MST066		MST067		MST069	
	Location Type Date Collected	Stream 5/11/2016		Stream 5/11/2016		Stream 5/11/2016	
	<u>Screening Levels</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)							
Cadmium	0.0006 mg/L	0.000015 FJ	--	0.0011	--	0.0017	--
Calcium		56.3 D	--	324 D	--	489 D	--
Magnesium		14.5	--	69.5 D	--	85.6 D	--
Selenium	0.0031 mg/L	0.0332	0.0339	0.461 D	0.447 D	1.49 D	1.59 D
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	--	49.2 J-	--	820 DJ-	--	1180 DJ-	--
Total dissolved solids	--	--	299	--	220	--	2020

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS
P4 RI/FS
(Page 7 of 17)

Analyte (Units)	Location Identification		MST069		MST089		MST090	
	Location Type	Date Collected	Stream	9/27/2016	Stream	5/10/2016	Stream	5/10/2016
	<u>Screening Levels</u>		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)								
Cadmium		0.0006 mg/L	0.00099	--	0.000028 FJ	--	<0.00008	--
Calcium			456 D	--	67.2 D	--	60.7 D	--
Magnesium			95.6 D	--	11.6	--	7.63	--
Selenium		0.0031 mg/L	1.35 D	1.32 DJ	0.0053	0.0056	<0.0005	0.00026 FJ
Chemistry Parameters (mg/L)								
Sulfate (as SO ₄)	--		1190 D	--	38.6 J-	--	2.0 J-	--
Total dissolved solids	--		--	2180	--	267	--	1550

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS
P4 RI/FS
 (Page 8 of 17)

Analyte (Units)	Location Identification	MST092		MST094		MST095	
	Location Type Date Collected	Stream 5/10/2016		Stream 5/10/2016		Stream 5/11/2016	
	<u>Screening Levels</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)							
Cadmium	0.0006 mg/L	0.000045 FJ	--	0.000018 FJ	--	0.0003	--
Calcium		81.8 D	--	55.5 D	--	107 D	--
Magnesium		15	--	6.34	--	25.6 D	--
Selenium	0.0031 mg/L	0.013	0.0136	0.0008	0.00082	0.0864	0.0859
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	--	83.6 J-	--	4.5 J-	--	142 DJ-	--
Total dissolved solids	--	--	321	--	182	--	475

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS
P4 RI/FS
(Page 9 of 17)

Analyte (Units)	Location Identification	MST096		NWPOND		SEPOND	
	Location Type Date Collected	Stream 5/10/2016		Pond 9/27/2016		Pond 9/27/2016	
	<u>Screening Levels</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)							
Cadmium	0.0006 mg/L	<0.00008	--	<.00008	--	0.00011	--
Calcium		93.5 D	--	44.1 D	--	40 D	--
Magnesium		18.5	--	8.85	--	11.6	--
Selenium	0.0031 mg/L	0.0609	0.0668	0.00057	0.0011 J	0.0068	0.0111 J
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	--	128 DJ-	--	2.4	--	7.1	--
Total dissolved solids	--	--	362	--	279	--	316

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS

P4 RI/FS

(Page 10 of 17)

Analyte (Units)	Location Identification	MDS025		MDS025		MDS026	
	Location Type Date Collected	Seep 5/13/2016		Seep 9/27/2016		Seep 5/13/2016	
	<u>Screening Levels</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)							
Cadmium	0.0006 mg/L	0.00076	--	0.0011	--	0.001	--
Calcium		245 D	--	306 D	--	335 D	--
Magnesium		61.5 D	--	82 D	--	76.6 D	--
Selenium	0.0031 mg/L	0.174	0.177	0.0198	0.088 J	0.019	0.0786
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	--	616 DJ-	--	744 D	--	741 DJ-	--
Total dissolved solids	--	--	1080	--	1440	--	1390

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS

P4 RI/FS

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Analyte (Units)	Location Identification		MST128		MST131		MST132	
	Location Type	Date Collected	Stream	5/13/2016	Stream	5/13/2016	Stream	5/13/2016
	<u>Screening Levels</u>		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)								
Cadmium		0.0006 mg/L	<0.00008	--	0.000019 UBF	--	0.00003 UBF	--
Calcium			71.4 D	--	62 D	--	70.3 D	--
Magnesium			12.7	--	9.87	--	11.9	--
Selenium		0.0031 mg/L	0.00093	0.00091	0.0038	0.0038	0.0016	0.0017
Chemistry Parameters (mg/L)								
Sulfate (as SO ₄)	--		27.5 J-	--	24.9 J-	--	27.4 J-	--
Total dissolved solids	--		--	247	--	231	--	245

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS

P4 RI/FS

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Analyte (Units)	Location Identification	MST132 Dup		MST132 Avg		MST133	
	Location Type Date Collected	Stream 5/13/2016		Stream 5/13/2016		Stream 5/13/2016	
	<u>Screening Levels</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)							
Cadmium	0.0006 mg/L	<0.00008	--	0.00003 UB	--	0.000025 UBF	--
Calcium		65.7 D	--	68 D	--	48.3 D	--
Magnesium		11.8	--	11.85	--	6.3	--
Selenium	0.0031 mg/L	0.0017	0.0016	0.00165	0.00165	0.0049	0.0051
				--	--		
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	--	27.4 J-	--	27.4 J-	--	15.9 J-	--
Total dissolved solids	--	--	243	--	244	--	178

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

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SUMMARY OF 2016 SURFACE WATER RESULTS

P4 RI/FS

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Analyte (Units)	Location Identification		MST136		MST143		MST144	
	Location Type	Date Collected	Stream	5/12/2016	Stream	5/13/2016	Stream	5/13/2016
	<u>Screening Levels</u>		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)								
Cadmium	0.0006 mg/L		0.000061 UBF	--	0.000087 J+	--	0.000065 UBF	--
Calcium			51.8 D	--	15.6	--	121 D	--
Magnesium			8.16	--	4.04	--	28.2 D	--
Selenium	0.0031 mg/L		0.0012	0.0015	0.0002 FJ	0.00023 FJ	0.365	0.359
Chemistry Parameters (mg/L)								
Sulfate (as SO ₄)	--		34.5 J-	--	1.4 J	--	261 DJ-	--
Total dissolved solids	--		--	238 J-	--	104	--	515

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

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SUMMARY OF 2016 SURFACE WATER RESULTS

P4 RI/FS

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Analyte (Units)	Location Identification		MST274		MDS034		MST044	
	Location Type	Date Collected	Stream	5/13/2016	Seep	5/12/2016	Stream	5/12/2016
	Screening Levels							
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	
Cadmium	0.0006 mg/L	0.000016 UBF	--	0.000068 UBF	--	0.000026 UBF	--	
Calcium		88.6 D	--	121 D	--	73 D	--	
Magnesium		12.1	--	42.6 D	--	20	--	
Selenium	0.0031 mg/L	0.0033	0.0032	0.0313	0.0338	0.0004 FJ	0.00049 UBF	
Chemistry Parameters (mg/L)								
Sulfate (as SO ₄)	--	51.0 J-	--	134 DJ-	--	61.6 J-	--	
Total dissolved solids	--	--	321	--	609 J-	--	373 J-	

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS

P4 RI/FS

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Analyte (Units)	Location Identification	MST044		MST045		MST045 Dup	
	Location Type Date Collected	Stream 9/27/2016		Stream 5/12/2016		Stream 5/12/2016	
	<u>Screening Levels</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)							
Cadmium	0.0006 mg/L	<.00008	--	0.000018 UBF	--	0.000027 UBF	--
Calcium		66.4 D	--	81.6 D	--	71.9 D	--
Magnesium		30.4 D	--	20.6	--	20.4	--
Selenium	0.0031 mg/L	0.00063	0.00066 J	0.00059 J+	0.00056 J+	0.00054 J+	0.00048 UBF
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	--	152 D	--	61.2 J-	--	61 J-	--
Total dissolved solids	--	--	492	--	378 J-	--	369 J-

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS

P4 RI/FS

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Analyte (Units)	Location Identification		MST045 Avg		MST045		MST057	
	Location Type	Date Collected	Stream	5/12/2016	Stream	9/27/2016	Stream	5/11/2016
	<u>Screening Levels</u>		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)								
Cadmium	0.0006 mg/L		0.0000225 UBF	--	<.00008	--	<0.00008	--
Calcium			76.75 D	--	70.1 D	--	66 D	--
Magnesium			20.5	--	30.6 D	--	10.7	--
Selenium	0.0031 mg/L		0.000565 J+	0.00052 UBF	0.00073	0.00069 J	0.00024 FJ	0.00021 FJ
			--	--				
Chemistry Parameters (mg/L)			--	--				
Sulfate (as SO ₄)	--		61.1 J-	--	153 D	--	12.5 J-	--
Total dissolved solids	--		--	373.5 J-	--	519	--	249

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-3

SUMMARY OF 2016 SURFACE WATER RESULTS

P4 RI/FS

(Page 17 of 17)

Analyte (Units)	Location Identification	MST063		MST226		MST275	
	Location Type Date Collected	Stream 5/11/2016		Stream 5/12/2016		Stream 5/12/2016	
	<u>Screening Levels</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Metals (mg/L)							
Cadmium	0.0006 mg/L	<0.00008	--	0.000067 UBF	--	0.000022 UBF	--
Calcium		78.6 D	--	50.8 DJ	--	10.4	--
Magnesium		12	--	8.63	--	2.29	--
Selenium	0.0031 mg/L	0.0208	0.0282	0.0042	0.004	<0.0005	0.00023 UBF
Chemistry Parameters (mg/L)							
Sulfate (as SO ₄)	--	31.9 J-	--	24 J-	--	1.7 J	--
Total dissolved solids	--	--	299	--	188 J-	--	102 J-

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

B-4 2016 Groundwater Analytical Data

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 1 of 13)

Location Identification		MBW006		MBW009		MBW011		MBW027	
Location Type		Bore Hole Well		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/15/2016		5/15/2016		5/15/2016		5/15/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Cadmium	0.005 mg/L	--	0.000027 UBF	--	0.00011 J+	--	0.00013 J+	--	0.00024
Manganese	0.05 mg/L	--	0.0075	--	0.137	--	0.008	--	0.00064
Selenium	0.05 mg/L	0.405	0.363	0.0027	0.0029	0.452 D	0.662 D	0.257	0.239
Chemistry Parameters (mg/L)									
Sulfate (as SO ₄)	250 mg/L	391 DJ-	--	349 DJ-	--	307 DJ-	--	188 DJ-	--
Total dissolved solids	500 mg/L	--	796	--	717	--	751	--	564

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 2 of 13)

Location Identification		MBW028		MBW032		MBW032 Dup		MBW032 Avg	
Location Type		Bore Hole Well		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/15/2016		5/11/2016		5/11/2016		5/11/2016	
Analyte (Units)									
	Screening Levels								
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.00026	--	0.00083	--	0.0008	--	0.000815
Manganese	0.05 mg/L	--	0.0405	--	0.0009	--	0.0014	--	0.00115
Selenium	0.05 mg/L	0.72 D	0.761 D	1.55 D	1.56 D	1.57 D	1.58 D	1.56 D	1.57 D
								--	--
Chemistry Parameters (mg/L)								--	--
Sulfate (as SO ₄)	250 mg/L	459 DJ-	--	1160 DJ-	--	1030 DJ-	--	1095 DJ-	--
Total dissolved solids	500 mg/L	--	976	--	1900	--	1890	--	1895

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 3 of 13)

Location Identification		MBW048		MBW130		MBW131		MBW135	
Location Type		Bore Hole Well		Bore Hole Well		Bore Hole Well		Bore Hole Well	
Date Collected		5/14/2016		5/15/2016		5/14/2016		5/14/2016	
Analyte (Units)									
	Screening Levels								
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.00014	--	0.00046	--	0.00014	--	0.000028 UBF
Manganese	0.05 mg/L	--	0.346	--	0.127	--	0.0014	--	0.141
Selenium	0.05 mg/L	<0.0005	<0.0005	0.00026 FJ	0.00039 FJ	0.0016	0.002	<0.0005	<0.0005
Chemistry Parameters (mg/L)									
Sulfate (as SO ₄)	250 mg/L	5.4 J-	--	10.7 J-	--	2.9 J-	--	51.0 J-	--
Total dissolved solids	500 mg/L	--	130	--	145	--	111	--	267

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 4 of 13)

Location Identification		MMW006		MMW017		MMW018		MMW020	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/10/2016		5/11/2016		5/11/2016		5/15/2016	
Analyte (Units)									
	Screening Levels								
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	<0.00008	--	0.00045	--	<0.00008	--	0.0069
Manganese	0.05 mg/L	--	0.00015 FJ	--	0.0028	--	0.023	--	0.0478
Selenium	0.05 mg/L	0.151	0.157	0.156	0.155	0.0297	0.0302	0.0664	0.0653
Chemistry Parameters (mg/L)									
Sulfate (as SO ₄)	250 mg/L	90.4 J-	--	520 DJ-	--	46.4 J-	--	203 DJ-	--
Total dissolved solids	500 mg/L	--	332	--	1090	--	264	--	626

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 5 of 13)

Location Identification		MMW021		MMW029		MMW030		MMW031	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/10/2016		5/11/2016		5/15/2016		5/13/2016	
Analyte (Units)									
	Screening Levels								
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Cadmium	0.005 mg/L	--	0.000061 UBF	--	<0.00008	--	<0.00008	--	<0.00008
Manganese	0.05 mg/L	--	<0.0005	--	0.00058	--	0.0211	--	0.00015 FJ
Selenium	0.05 mg/L	0.0544	0.0556	0.634 D	0.626 D	<0.0005	<0.0005	0.00088	0.00093
Chemistry Parameters (mg/L)									
Sulfate (as SO ₄)	250 mg/L	48.7 J-	--	642 DJ-	--	15.0 J-	--	2.9 J-	--
Total dissolved solids	500 mg/L	--	358	--	1280	--	229	--	167

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 6 of 13)

Location Identification		MMW032		MMW033		MW15A		MW16A	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/15/2016		5/11/2016		5/15/2016		5/10/2016	
Analyte (Units)									
	Screening Levels								
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.00017	--	0.000013 UBF	--	0.00022	--	<0.00008
Manganese	0.05 mg/L	--	0.0016	--	0.0443	--	0.00018 FJ	--	1.81 D
Selenium	0.05 mg/L	0.002	0.002	0.00018 FJ	0.00014 FJ	1.04 D	1.09 D	0.0088	0.0082
Chemistry Parameters (mg/L)									
Sulfate (as SO ₄)	250 mg/L	5.6 J-	--	28.2 J-	--	619 D	--	783 DJ-	--
Total dissolved solids	500 mg/L	--	224	--	267	--	1340	--	1370

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 7 of 13)

Location Identification		MBW085		MBW087		MBW099		MMW007	
Location Type		Bore Hole Well		Bore Hole Well		Bore Hole Well		Monitoring Well	
Date Collected		5/14/2016		5/14/2016		5/14/2016		5/13/2016	
Analyte (Units)									
	Screening Levels								
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Cadmium	0.005 mg/L	--	0.000015 UBF	--	0.000038 UBF	--	0.000054 UBF	--	0.000015 UBF
Manganese	0.05 mg/L	--	0.0043	--	0.0459	--	0.004	--	0.059
Selenium	0.05 mg/L	0.0011	0.0011	0.00022 FJ	0.00024 FJ	0.00038 FJ	0.00015 FJ	0.0017	0.0015
Chemistry Parameters (mg/L)									
Sulfate (as SO ₄)	250 mg/L	22.3 J-	--	23.8 J-	--	39.1 J-	--	14.8 J-	--
Total dissolved solids	500 mg/L	--	215	--	331	--	215	--	158

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 8 of 13)

Location Identification		MMW009		MMW013		MMW024		MMW025	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/13/2016		5/14/2016		5/14/2016		5/14/2016	
Analyte (Units)									
	Screening Levels								
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.00021 J+	--	<0.00008	--	<0.00008	--	<0.00008
Manganese	0.05 mg/L	--	0.0668	--	0.0177	--	0.00016 FJ	--	0.0024
Selenium	0.05 mg/L	<0.0005	<0.0005	0.178	0.17	0.0613	0.0574	0.00059	0.00053
Chemistry Parameters (mg/L)									
Sulfate (as SO4)	250 mg/L	60.7 J-	--	159 DJ-	--	340 DJ-	--	11.0 J-	--
Total dissolved solids	500 mg/L	--	393	--	467	--	781	--	171

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 9 of 13)

Location Identification		MMW026		MMW027		MMW034		MMW034 Dup	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/10/2016		5/13/2016		5/14/2016		5/14/2016	
Analyte (Units)									
	Screening Levels								
Metals (mg/L)		<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>	<u>Dissolved</u>	<u>Total</u>
Cadmium	0.005 mg/L	--	<0.00008	--	0.00016 J+	--	<0.00008	--	<0.00008
Manganese	0.05 mg/L	--	0.00053	--	0.00089	--	0.00033 FJ	--	0.0002 FJ
Selenium	0.05 mg/L	0.0013	0.0013	0.689 D	0.759 D	0.0857	0.0888	0.0886	0.0838
Chemistry Parameters (mg/L)									
Sulfate (as SO ₄)	250 mg/L	25.2 J-	--	334 DJ-	--	132 DJ-	--	133 DJ-	--
Total dissolved solids	500 mg/L	--	243	--	840	--	390	--	370

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 10 of 13)

Location Identification		MMW034 Avg		MMW035		MMW036		MMW037	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/14/2016		5/13/2016		5/13/2016		5/13/2016	
Analyte (Units)									
Screening Levels									
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	<0.00008	--	<0.00008	--	0.000018 UBF	--	<0.00008
Manganese	0.05 mg/L	--	0.000265 FJ	--	0.0016	--	0.0018	--	0.0021
Selenium	0.05 mg/L	0.08715	0.0863	1.16 D	1.15 D	0.0194	0.0199	0.0306	0.0282
Chemistry Parameters (mg/L)									
Sulfate (as SO ₄)	250 mg/L	132.5 DJ-	--	498 DJ-	--	22.9 J-	--	31.0 J-	--
Total dissolved solids	500 mg/L	--	380	--	1160	--	246	--	260

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 11 of 13)

Location Identification		MMW037 Dup		MMW037 Avg		MMW010		MMW011	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/13/2016		5/13/2016		5/12/2016		5/12/2016	
Analyte (Units)									
	Screening Levels								
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	<0.00008	--	<0.00008	--	0.0058	--	0.0007
Manganese	0.05 mg/L	--	0.0023	--	0.0022	--	0.0123	--	0.00027 UBF
Selenium	0.05 mg/L	0.0304	0.0288	0.0305	0.0285	0.127	0.118	0.0005 UBF	0.00041 UBF
				--	--				
Chemistry Parameters (mg/L)				--	--				
Sulfate (as SO ₄)	250 mg/L	31.0 J-	--	31 J-	--	735 DJ-	--	136 DJ-	--
Total dissolved solids	500 mg/L	--	254	--	257	--	1520 J-	--	532 J-

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 12 of 13)

Location Identification		MMW022		MMW023		MMW028		MMW028 Dup	
Location Type		Monitoring Well		Monitoring Well		Monitoring Well		Monitoring Well	
Date Collected		5/12/2016		5/12/2016		5/12/2016		5/12/2016	
Analyte (Units)									
	Screening Levels								
Metals (mg/L)		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Cadmium	0.005 mg/L	--	0.00058	--	0.000043 FJ	--	0.000013 FJ	--	0.000023 UBF
Manganese	0.05 mg/L	--	0.193	--	0.308	--	<0.0005	--	<0.0005
Selenium	0.05 mg/L	0.0478	0.0446	0.00018 UBF	<0.0005	0.005	0.0036	0.0046	0.0037
Chemistry Parameters (mg/L)									
Sulfate (as SO ₄)	250 mg/L	273 DJ-	--	221 DJ-	--	68.7 J-	--	68.5 J-	--
Total dissolved solids	500 mg/L	--	683 J-	--	670 J-	--	349 J-	--	349 J-

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

TABLE B-4

SUMMARY OF 2016 GROUNDWATER RESULTS

P4 RI/FS

(Page 13 of 13)

Analyte (Units)	Location Identification	MMW028 Avg	
	Location Type Date Collected	Monitoring Well 5/12/2016	
	Screening Levels	Dissolved	Total
Metals (mg/L)			
Cadmium	0.005 mg/L	--	0.000018 UBF
Manganese	0.05 mg/L	--	<0.0005
Selenium	0.05 mg/L	0.0048	0.00365
		--	--
Chemistry Parameters (mg/L)		--	--
Sulfate (as SO ₄)	250 mg/L	68.6 J-	--
Total dissolved solids	500 mg/L	--	349 J-

mg/l milligrams per liter.

Bold Bolded result indicates positively identified compound.

-- Not scheduled.

Screening Levels are derived from promulgated federal and state chemical-specific primary and secondary standards.

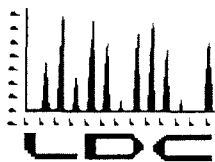
D Sample dilution required for analysis; reported values reflect the dilution.

F Analyte was positively identified but the reported concentration is estimated; reported concentration is less than the reporting limit, but greater than the method detection limit.

J Data are estimated due to associated quality control data.

UB Analyte considered not detected based on associated blank data.

**APPENDIX C - LABORATORY DATA CONSULTANTS (LDC)
THIRD PARTY VERIFICATION REPORTS**



LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

MWH Americas, Inc.
2890 East Cottonwood Parkway Suite 300
Salt Lake City, UT 84121
ATTN: Ms. Betty VanPelt

July 7, 2016

SUBJECT: Monsanto, P4 Background, Data Validation

Dear Ms. VanPelt,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on June 13, 2016. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #36509:

SDG #

Fraction

10348344, 10348356, 10348364
10348833, 10348839, 10349184

Metals & Wet Chemistry

The data verification was performed under Stage 2B & 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, April, 2004
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink
Project Manager/Chemist

90/10 2B/4

LDC #36509 (MWH Americas, Inc.-Salt Lake City, UT / Monsanto, P4 Background)

Shaded cells indicate Stage 4 review (all other cells are Stage 2B review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs L:\MWH\Monsanto P4\36509ST.wpd

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10348344

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMSG006-U	05/11/16	10348344001
1605SWMSG007-U	05/11/16	10348344003
1605SWMT095-U	05/11/16	10348344005
1605SWMT069-U	05/11/16	10348344007
1605SWMT020-U	05/11/16	10348344009
1605SWMT066-U	05/11/16	10348344011
1605SWMT067-U	05/11/16	10348344013
1605SWMT063-U	05/11/16	10348344015
1605SWMT057-U	05/11/16	10348344017
1605SWMSG006-F	05/11/16	10348344002
1605SWMSG007-F	05/11/16	10348344004
1605SWMT095-F	05/11/16	10348344006
1605SWMT069-F	05/11/16	10348344008
1605SWMT020-F	05/11/16	10348344010
1605SWMT066-F	05/11/16	10348344012
1605SWMT067-F	05/11/16	10348344014
1605SWMT063-F	05/11/16	10348344016

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Calcium, Magnesium, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UJ | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for manganese are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

For 10348356002MS/MSD no data were qualified for Calcium percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration and a non-client sample was used.

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of $\pm 10\%$ difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 10348344

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG 10348344

No Sample Data Qualified in this SDG

Metals - Field Blank Data Qualification Summary - SDG 10348344

No Sample Data Qualified in this SDG

LDC #: 36509A4a
 SDG #: 10348344
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 7/11/16
 Page: 1 of 2
 Reviewer: JP
 2nd Reviewer: Q

METHOD: Metals (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	5/11/16
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	SW	MS/D = Non client sample
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	BER = Non client sample
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet

ND = No compounds detected
 R = Rinsate
 FB = Field blank

D = Duplicate
 TB = Trip blank
 EB = Equipment blank

SB=Source blank
 OTHER:

	Client ID	Lab ID	Matrix	Date
1	1605SWMSG006-U	10348344001	Water	05/11/16
2	1605SWMSG007-U	10348344003	Water	05/11/16
3	1605SWMT095-U	10348344005	Water	05/11/16
4	1605SWMT069-U	10348344007	Water	05/11/16
5	1605SWMT020-U	10348344009	Water	05/11/16
6	1605SWMT066-U	10348344011	Water	05/11/16
7	1605SWMT067-U	10348344013	Water	05/11/16
8	1605SWMT063-U	10348344015	Water	05/11/16
9	1605SWMT057-U	10348344017	Water	05/11/16
10	1605SWMSG006-F	10348344002	Water	05/11/16
11	1605SWMSG007-F	10348344004	Water	05/11/16
12	1605SWMT095-F	10348344006	Water	05/11/16
13	1605SWMT069-F	10348344008	Water	05/11/16
14	1605SWMT020-F	10348344010	Water	05/11/16
15	1605SWMT066-F	10348344012	Water	05/11/16

LDC #: 36509A4a
SDG #: 10348344
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 7/11/16
Page: 2 of 2
Reviewer: SD
2nd Reviewer: ✓

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
16	1605SWMT067-F	10348344014	Water	05/11/16
17	1605SWMT063-F	10348344016	Water	05/11/16
18	1605SWMT057-F	10348344018	Water	05/11/16
19				
20				
21				
22				
23				

Notes: _____

All circled elements are applicable to each sample.

[illegible]

Comments: Mercury by CVAA if performed

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

<u>Y</u> <u>N</u> <u>N/A</u>	Was a matrix spike analyzed for each matrix in this SDG?
<u>Y</u> <u>N</u> <u>N/A</u>	Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
<u>Y</u> <u>N</u> <u>N/A</u>	Were all duplicate sample relative percent differences (RPD) $\leq 20\%$ for samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

[illegible]

Comments: _____

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10348344

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMSG006-U	05/11/16	10348344001
1605SWMSG007-U	05/11/16	10348344003
1605SWMT095-U	05/11/16	10348344005
1605SWMT069-U	05/11/16	10348344007
1605SWMT020-U	05/11/16	10348344009
1605SWMT066-U	05/11/16	10348344011
1605SWMT067-U	05/11/16	10348344013
1605SWMT063-U	05/11/16	10348344015
1605SWMT057-U	05/11/16	10348344017
1605SWMSG006-F	05/11/16	10348344002
1605SWMSG007-F	05/11/16	10348344004
1605SWMT095-F	05/11/16	10348344006
1605SWMT069-F	05/11/16	10348344008
1605SWMT020-F	05/11/16	10348344010
1605SWMT066-F	05/11/16	10348344012
1605SWMT067-F	05/11/16	10348344014
1605SWMT063-F	05/11/16	10348344016
1605SWMT057-F	05/11/16	10348344018
1605SWMT066-FMS	05/11/16	10348344012MS
1605SWMT066-FMSD	05/11/16	10348344012MSD
1605SWMSG007-UDUP	05/11/16	10348344003DUP

Introduction

This data review covers 21 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UJ | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 6 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Sulfate	0.44 mg/L	1605SWMT067-F 1605SWMT057-F
PB (prep blank)	Total dissolved solids	5.0 mg/L	1605SWMSG007-U 1605SWMT095-U 1605SWMT069-U 1605SWMT020-U 1605SWMT066-U 1605SWMT067-U 1605SWMT063-U 1605SWMT057-U

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
1605SWMST089-FMS/MSD (1605SWMSG006-F 1605SWMSG007-F 1605SWMT095-F 1605SWMT069-F 1605SWMT020-F)	Sulfate	67 (90-110)	63 (90-110)	J- (all detects)	A
1605SWMSG005-FMS/MSD (1605SWMSG006-F 1605SWMSG007-F 1605SWMT095-F 1605SWMT069-F 1605SWMT020-F)	Sulfate	43 (90-110)	66 (90-110)	J- (all detects)	A
1605GWMMW018-FMS/MSD (1605SWMT066-F 1605SWMT067-F 1605SWMT063-F 1605SWMT057-F)	Sulfate	61 (90-110)	53 (90-110)	J- (all detects)	A
1605SWMT066-FMS/MSD (1605SWMT066-F 1605SWMT067-F 1605SWMT063-F 1605SWMT057-F)	Sulfate	22 (90-110)	49 (90-110)	J- (all detects)	A

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
1605SWMST089-FMS/MSD (1605SWMSG006-F 1605SWMSG007-F 1605SWMT095-F 1605SWMT069-F 1605SWMT020-F)	Sulfate	67 (90-110)	63 (90-110)	J- (all detects)	A
1605SWMSG005-FMS/MSD (1605SWMSG006-F 1605SWMSG007-F 1605SWMT095-F 1605SWMT069-F 1605SWMT020-F)	Sulfate	43 (90-110)	66 (90-110)	J- (all detects)	A
1605GWMMW018-FMS/MSD (1605SWMT066-F 1605SWMT067-F 1605SWMT063-F 1605SWMT057-F)	Sulfate	61 (90-110)	53 (90-110)	J- (all detects)	A
1605SWMT066-FMS/MSD (1605SWMT066-F 1605SWMT067-F 1605SWMT063-F 1605SWMT057-F)	Sulfate	22 (90-110)	49 (90-110)	J- (all detects)	A

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG 10348344

Sample	Analyte	Flag	A or P	Reason (Code)
1605SWMSG006-F 1605SWMSG007-F 1605SWMT095-F 1605SWMT069-F 1605SWMT020-F 1605SWMT066-F 1605SWMT067-F 1605SWMT063-F 1605SWMT057-F	Sulfate	J- (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (16)

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 10348344

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG 10348344

No Sample Data Qualified in this SDG

LDC #: 36509A6
SDG #: 10348344
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 7/11/16
Page: 1 of 2
Reviewer: JD
2nd Reviewer: A

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	5/11/16
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MS10 = SW
VII.	Duplicate sample analysis	A	DUP = 1605SGWMMW018-UDUP(SDG:10348356)
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	A	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	1605SWMSG006-U	10348344001	Water	05/11/16
2	1605SWMSG007-U	10348344003	Water	05/11/16
3	1605SWMT095-U	10348344005	Water	05/11/16
4	1605SWMT069-U	10348344007	Water	05/11/16
5	1605SWMT020-U	10348344009	Water	05/11/16
6	1605SWMT066-U	10348344011	Water	05/11/16
7	1605SWMT067-U	10348344013	Water	05/11/16
8	1605SWMT063-U	10348344015	Water	05/11/16
9	1605SWMT057-U	10348344017	Water	05/11/16
10	1605SWMSG006-F	10348344002	Water	05/11/16
11	1605SWMSG007-F	10348344004	Water	05/11/16
12	1605SWMT095-F	10348344006	Water	05/11/16
13	1605SWMT069-F	10348344008	Water	05/11/16
14	1605SWMT020-F	10348344010	Water	05/11/16
15	1605SWMT066-F	10348344012	Water	05/11/16
16	1605SWMT067-F	10348344014	Water	05/11/16
17	1605SWMT063-F	10348344016	Water	05/11/16

LDC #: 36509A6
SDG #: 10348344
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 7/1/16
Page: 2 of 2
Reviewer: SD
2nd Reviewer: A

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID	Lab ID	Matrix	Date
18	1605SWMT057-F	SD 4	Water	05/11/16
19	#15 MS			
20	#15 MSD			
21	#2 Dup			
22				
23				

Notes:

All circled methods are applicable to each sample.

[illegible]

Comments: _____

VALIDATION FINDINGS WORKSHEET Blanks

METHOD: Inorganics, Method See Cover

Conc. units: mg/L

Associated Samples: 16, 18 (16 = 10X) (10)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qualifiers									
SO4		0.44	2.2										

Conc. units: mg/L

Associated Samples: 2-9

(11)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qualifiers									
TDS	5.0		25										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10348356

Sample Identification	Collection Date	Laboratory Sample Identification
1605GWMMW018-U	05/11/16	10348356001
1605GWMMW029-U	05/11/16	10348356003
1605GWMMW033-U	05/11/16	10348356005
1605GWMBW032-1-U	05/11/16	10348356007
1605GWMBW032-2-U	05/11/16	10348356009
1605GWMMW017-U	05/11/16	10348356012
1605GWMMW018-F	05/11/16	10348356002
1605GWMMW029-F	05/11/16	10348356004
1605GWMMW033-F	05/11/16	10348356006
1605GWMBW032-1-F	05/11/16	10348356008
1605GWMBW032-2-F	05/11/16	10348356010
1605GWMMW017-F	05/11/16	10348356011
1605GWMMW018-UMS	05/11/16	10348356001MS
1605GWMMW018-UMSD	05/11/16	10348356001MSD
1605GWMMW018-FMS	05/11/16	10348356002MS
1605GWMMW018-FMSD	05/11/16	10348356002MSD

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UJ | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for manganese are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Cadmium	0.014 ug/L	1605GWMMW018-U 1605GWMMW029-U 1605GWMMW033-U 1605GWMBW032-1-U 1605GWMBW032-2-U 1605GWMMW017-U

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1605GWMMW033-U	Cadmium	0.013 ug/L	0.013U ug/L

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of $\pm 10\%$ difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 10348356

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG 10348356

Sample	Analyte	Modified Final Concentration	A or P	Code
1605GWMMW033-U	Cadmium	0.013U ug/L	A	10

Metals - Field Blank Data Qualification Summary - SDG 10348356

No Sample Data Qualified in this SDG

LDC #: 36509B4b
 SDG #: 10348356
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 7/11/16
 Page: 1 of 2
 Reviewer: JS
 2nd Reviewer: aw

METHOD: Metals (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	Still in
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MSD = (13.14) (15.16)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet

ND = No compounds detected
 R = Rinsate
 FB = Field blank

D = Duplicate
 TB = Trip blank
 EB = Equipment blank

SB=Source blank
 OTHER:

	Client ID	Lab ID	Matrix	Date
1	1605GWMMW018-U	Cd, Mn, Se 10348356001	Water	05/11/16
2	1605GWMMW029-U	↓ 10348356003	Water	05/11/16
3	1605GWMMW033-U	↓ 10348356005	Water	05/11/16
4	1605GWMBW032-U -1-U	↓ 10348356007	Water	05/11/16
5	1605GWMBW032-U -2-U	↓ 10348356009	Water	05/11/16
6	1605GWMMW017-U	↓ 10348356012	Water	05/11/16
7	1605GWMMW018-F	Se 10348356002	Water	05/11/16
8	1605GWMMW029-F	↓ 10348356004	Water	05/11/16
9	1605GWMMW033-F	↓ 10348356006	Water	05/11/16
10	1605GWMBW032-F -1-F	↓ 10348356008	Water	05/11/16
11	1605GWMBW032-F -2-F	↓ 10348356010	Water	05/11/16
12	1605GWMMW017-F	↓ 10348356011	Water	05/11/16
13	1605GWMMW018-UMS	Cd, Mn, Se 10348356001MS	Water	05/11/16
14	1605GWMMW018-UMSD	↓ 10348356001MSD	Water	05/11/16
15	1605GWMMW018-FMS	Se 10348356002MS	Water	05/11/16

LDC #: 36509B4a
SDG #: 10348356
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 7/11/16
Page: 2 of 2
Reviewer: SD
2nd Reviewer: a

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
16	1605GWMMW018-FMSD <i>Se</i>	10348356002MSD	Water	05/11/16
17				
18				
19				
20				
21				

Notes: _____

[illegible]

ICP	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Sn, Ti, _____
ICP-MS	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Sn, Ti, _____
GF-AAS	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Sn, Ti, _____

ELEMENTS.wpd

LDC #: 36509B4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1

Reviewer: JD

2nd Reviewer: [Signature]

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)

Soil preparation factor applied: _____

Sample Concentration units, unless otherwise noted: _____ ug/L

Associated Samples: _____ 1-6 (15)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/l)	Maximum ICB/CCB ^a (ug/l)	Blank Action Limit	3									
Cd			0.014	0.07	0.013									

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10348356

Sample Identification	Collection Date	Laboratory Sample Identification
1605GWMMW018-U	05/11/16	10348356001
1605GWMMW029-U	05/11/16	10348356003
1605GWMMW033-U	05/11/16	10348356005
1605GWMBW032-1-U	05/11/16	10348356007
1605GWMBW032-2-U	05/11/16	10348356009
1605GWMMW017-U	05/11/16	10348356012
1605GWMMW018-F	05/11/16	10348356002
1605GWMMW029-F	05/11/16	10348356004
1605GWMMW033-F	05/11/16	10348356006
1605GWMBW032-1-F	05/11/16	10348356008
1605GWMBW032-2-F	05/11/16	10348356010
1605GWMMW017-F	05/11/16	10348356011
1605GWMMW018-UDUP	05/11/16	10348356001DUP
1605GWMMW018-FMS	05/11/16	10348356002MS
1605GWMMW018-FMSD	05/11/16	10348356002MSD

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UJ | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 6 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Sulfate	0.44 mg/L	1605GWMMW033-F
PB (prep blank)	Total dissolved solids	5.0 mg/L	1605GWMMW018-U 1605GWMMW029-U 1605GWMMW033-U 1605GWMBW032-1-U

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
1605GWMMW018-FMS/MSD (1605GWMMW018-F 1605GWMMW029-F 1605GWMMW033-F 1605GWMBW032-1-F 1605GWMBW032-2-F 1605GWMMW017-F)	Sulfate	61 (90-110)	53 (90-110)	J- (all detects)	A
1605SWMW066-FMS/MSD (1605GWMMW018-F 1605GWMMW029-F 1605GWMMW033-F 1605GWMBW032-1-F 1605GWMBW032-2-F 1605GWMMW017-F)	Sulfate	22 (90-110)	49 (90-110)	J- (all detects)	A

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG 10348356

Sample	Analyte	Flag	A or P	Reason (Code)
1605GWMMW018-F 1605GWMMW029-F 1605GWMMW033-F 1605GWMBW032-1-F 1605GWMBW032-2-F 1605GWMMW017-F	Sulfate	J- (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (16)

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 10348356

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG 10348356

No Sample Data Qualified in this SDG

LDC #: 36509B6
SDG #: 10348356
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/11/16
Page: 1 of 1
Reviewer: SD
2nd Reviewer: aw

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.4)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	5/11/16
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Laboratory Blanks	SW	
V.	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MSPD = 1605SWMMW066-FMSID (SDG: 10348344)
VII.	Duplicate sample analysis	A	DUP = 1605SWMMW06007-U (SDG: 10348344)
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	1605GWMMW018-U	10348356001	Water	05/11/16
2	1605GWMMW029-U	10348356003	Water	05/11/16
3	1605GWMMW033-U	10348356005	Water	05/11/16
4	1605GWMBW032-U -1-U	10348356007	Water	05/11/16
5	1605GWMBW032-U -2-U	10348356009	Water	05/11/16
6	1605GWMMW017-U	10348356012	Water	05/11/16
7	1605GWMMW018-F	10348356002	Water	05/11/16
8	1605GWMMW029-F	10348356004	Water	05/11/16
9	1605GWMMW033-F	10348356006	Water	05/11/16
10	1605GWMBW032-F -1-F	10348356008	Water	05/11/16
11	1605GWMBW032-F -2-F	10348356010	Water	05/11/16
12	1605GWMMW017-F	10348356011	Water	05/11/16
13	1605GWMMW018-UDUP	10348356001DUP	Water	05/11/16
14	1605GWMMW018-FMS	10348356002MS	Water	05/11/16
15	1605GWMMW018-FMSD	10348356002MSD	Water	05/11/16
16				
17				

All circled methods are applicable to each sample.

[illegible]

Comments:

LDC #: 36509B6

VALIDATION FINDINGS WORKSHEET
BlanksPage: 1 of 1
Reviewer: SD
2nd Reviewer: el

METHOD: Inorganics, Method See Cover

Conc. units: mg/L

Associated Samples: 9

(10)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qualifiers									
SO4		0.44	2.2										

Conc. units: mg/L

Associated Samples: 1-4

(11)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qualifiers									
TDS	5.0		25										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y/N N/A	Was a matrix spike analyzed for each matrix in this SDG?
Y/N N/A	Were matrix spike percent recoveries (%R) within the control limits of 80-120? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
Y/N N/A	Were all duplicate sample relative percent differences (RPD) $\leq 20\%$ for samples?

LEVEL IV ONLY:

Y	N	N/A	Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.
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[illegible]

Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10348364

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMST019-U	05/09/16	10348364001
1605SWMST050-U	05/09/16	10348364003
1605SWMDS030-1-U	05/10/16	10348364005
1605SWMDS030-2-U	05/10/16	10348364007
1605SWMST092-U	05/10/16	10348364009
1605SWMST089-U	05/10/16	10348364011
1605SWMST090-U	05/10/16	10348364013
1605SWMST096-U	05/10/16	10348364015
1605SWMSG004-U	05/10/16	10348364017
1605SWMSG005-U	05/10/16	10348364019
1605SWMST094-U	05/10/16	10348364021
1605GWMMW026-U	05/10/16	10348364023
1605GWMMW021-U	05/10/16	10348364025
1605GWMMW006-U	05/10/16	10348364027
1605GWMW16A-U	05/10/16	10348364029
1605SWMST019-F	05/09/16	10348364002
1605SWMST050-F	05/09/16	10348364004
1605SWMDS030-1-F	05/10/16	10348364006
1605SWMDS030-2-F	05/10/16	10348364008
1605SWMST092-F	05/10/16	10348364010
1605SWMST089-F	05/10/16	10348364012
1605SWMST090-F	05/10/16	10348364014
1605SWMST096-F	05/10/16	10348364016
1605SWMSG004-F	05/10/16	10348364018
1605SWMSG005-F	05/10/16	10348364020

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMST094-F	05/10/16	10348364022
1605GWMMW026-F	05/10/16	10348364024
1605GWMMW021-F	05/10/16	10348364026
1605GWMMW006-F	05/10/16	10348364028
1605GWMW16A-F	05/10/16	10348364030
1605SWMST089-UMS	05/10/16	10348364011MS
1605SWMST089-UMSD	05/10/16	10348364011MSD
1605SWMST089-FMS	05/10/16	10348364012MS
1605SWMST089-FMSD	05/10/16	10348364012MSD
1605SWMSG005-UMS	05/10/16	10348364019MS
1605SWMSG005-UMSD	05/10/16	10348364019MSD
1605SWMSG005-FMS	05/10/16	10348364020MS
1605SWMST094-FMSD	05/10/16	10348364022MSD

Introduction

This data review covers 38 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Calcium, Magnesium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UJ | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for manganese are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Cadmium	0.028 ug/L	1605GWMMW026-U 1605GWMMW021-U 1605GWMMW006-U 1605GWMMW16A-U

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1605GWMMW021-U	Cadmium	0.061 ug/L	0.061U ug/L

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

For 1605SWMSG005-UMS/MSD and 1605SWMSG005-FMS/MSD no data were qualified for Calcium and Magnesium percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration.

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of $\pm 10\%$ difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 10348364

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG 10348364

Sample	Analyte	Modified Final Concentration	A or P	Code
1605GWMMW021-U	Cadmium	0.061U ug/L	A	10

Metals - Field Blank Data Qualification Summary - SDG 10348364

No Sample Data Qualified in this SDG

LDC #: 36509C4b
 SDG #: 10348364
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 7/1/16
 Page: 1 of 2
 Reviewer: ESD
 2nd Reviewer: ca

METHOD: Metals (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	SR-10/16
II.	ICP/MS Tune	A	
III.	Instrument Calibration	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	SW	MSD = (31, 32) (33, 34) (35, 36) (37, 38)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet

ND = No compounds detected
 R = Rinsate
 FB = Field blank

D = Duplicate
 TB = Trip blank
 EB = Equipment blank

SB=Source blank
 OTHER:

	Client ID	Lab ID	Matrix	Date
1	1605SWMST019-U	10348364001	Water	05/09/16
2	1605SWMST050-U	10348364003	Water	05/09/16
3	1605SWMDS030-1-U	10348364005	Water	05/10/16
4	1605SWMDS030-2-U	10348364007	Water	05/10/16
5	1605SWMST092-U	10348364009	Water	05/10/16
6	1605SWMST089-U	10348364011	Water	05/10/16
7	1605SWMST090-U	10348364013	Water	05/10/16
8	1605SWMST096-U	10348364015	Water	05/10/16
9	1605SWMSG004-U	10348364017	Water	05/10/16
10	1605SWMSG005-U	10348364019	Water	05/10/16
11	1605SWMST094-U	10348364021	Water	05/10/16
12	1605GWMMW026-U	10348364023	Water	05/10/16
13	1605GWMMW021-U	10348364025	Water	05/10/16
14	1605GWMMW006-U	10348364027	Water	05/10/16
15	1605GWMW16A-U	10348364029	Water	05/10/16

LDC #: 36509C4a
 SDG #: 10348364
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET
 Stage 2B

Date: 7/1/16
 Page: 2 of 2
 Reviewer: SD
 2nd Reviewer: _____

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
16	1605SWMST019-F	10348364002	Water	05/09/16
17	1605SWMST050-F	10348364004	Water	05/09/16
18	1605SWMDS030-1-F	10348364006	Water	05/10/16
19	1605SWMDS030-2-F	10348364008	Water	05/10/16
20	1605SWMST092-F	10348364010	Water	05/10/16
21	1605SWMST089-F	10348364012	Water	05/10/16
22	1605SWMST090-F	10348364014	Water	05/10/16
23	1605SWMST096-F	10348364016	Water	05/10/16
24	1605SWMSG004-F	10348364018	Water	05/10/16
25	1605SWMSG005-F	10348364020	Water	05/10/16
26	1605SWMST094-F	10348364022	Water	05/10/16
27	1605GWMMW026-F	10348364024	Water	05/10/16
28	1605GWMMW021-F	10348364026	Water	05/10/16
29	1605GWMMW006-F	10348364028	Water	05/10/16
30	1605GWMW16A-F	10348364030	Water	05/10/16
31	1605SWMST089-UMS	10348364011MS	Water	05/10/16
32	1605SWMST089-UMSD	10348364011MSD	Water	05/10/16
33	1605SWMST089-FMS	10348364012MS	Water	05/10/16
34	1605SWMST089-FMSD	10348364012MSD	Water	05/10/16
35	1605SWMSG005-UMS	10348364019MS	Water	05/10/16
36	1605SWMSG005-UMSD	10348364019MSD	Water	05/10/16
37	#25 MS			
38	#25 MSD			
39				
40				
41				

Notes: _____

VALIDATION FINDINGS WORKSHEET

Sample Specific Element Reference

All circled elements are applicable to each sample.

[illegible]

Comments: Mercury by CVAA if performed

VALIDATION FINDINGS WORKSHEET

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y	N	N/A	Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%)?
---	---	-----	--

LEVEL IV ONLY:

Y	N	N/A	
			Was a midrange cyanide standard distilled?

Y	N	N/A	Are all correlation coefficients >0.995 ?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

[illegible]

Comments: _____

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)

Soil preparation factor applied: _____

Sample Concentration units, unless otherwise noted: ug/L

Associated Samples: 12-15 (10)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	13									
Cd			0.028	0.14	0.061									

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y/N/N/A	Was a matrix spike analyzed for each matrix in this SDG?
Y/N/N/A	Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
Y/N/N/A	Were all duplicate sample relative percent differences (RPD) $\leq 20\%$ for samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

[illegible]

Comments: _____

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10348364

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMST019-U	05/09/16	10348364001
1605SWMST050-U	05/09/16	10348364003
1605SWMDS030-1-U	05/10/16	10348364005
1605SWMDS030-2-U	05/10/16	10348364007
1605SWMST092-U	05/10/16	10348364009
1605SWMST089-U	05/10/16	10348364011
1605SWMST090-U	05/10/16	10348364013
1605SWMST096-U	05/10/16	10348364015
1605SWMSG004-U	05/10/16	10348364017
1605SWMSG005-U	05/10/16	10348364019
1605SWMST094-U	05/10/16	10348364021
1605GWMMW026-U	05/10/16	10348364023
1605GWMMW021-U	05/10/16	10348364025
1605GWMMW006-U	05/10/16	10348364027
1605GWMW16A-U	05/10/16	10348364029
1605SWMST019-F	05/09/16	10348364002
1605SWMST050-F	05/09/16	10348364004
1605SWMDS030-1-F	05/10/16	10348364006
1605SWMDS030-2-F	05/10/16	10348364008
1605SWMST092-F	05/10/16	10348364010
1605SWMST089-F	05/10/16	10348364012
1605SWMST090-F	05/10/16	10348364014
1605SWMST096-F	05/10/16	10348364016
1605SWMSG004-F	05/10/16	10348364018
1605SWMSG005-F	05/10/16	10348364020

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMST094-F	05/10/16	10348364022
1605GWMMW026-F	05/10/16	10348364024
1605GWMMW021-F	05/10/16	10348364026
1605GWMMW006-F	05/10/16	10348364028
1605GWMMW16A-F	05/10/16	10348364030
1605SWMST089-UDUP	05/10/16	10348364011DUP
1605SWMST089-FMS	05/10/16	10348364012MS
1605SWMST089-FMSD	05/10/16	10348364012MSD
1605SWMSG005-UDUP	05/10/16	10348364019DUP
1605SWMSG005-FMS	05/10/16	10348364020MS
1605SWMSG005-FMSD	05/10/16	10348364020MSD

Introduction

This data review covers 36 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UJ | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 6 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Total dissolved solids	5.0 mg/L	1605SWMSG005-U 1605GWMMW006-U 1605GWMMW16A-U

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

Total Dissolved Solid results were outside the QC limits; although the results were outside control limits, client samples were not qualified because it is unknown whether the non-client sample (10348093002) is representative of client's sample matrix.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
1605SWMST089-FMS/MSD (1605SWMST019-F 1605SWMST050-F 1605SWMDS030-1-F 1605SWMDS030-2-F 1605SWMST092-F 1605SWMST089-F 1605SWMST090-F 1605SWMST096-F 1605SWMSG004-F 1605SWMSG005-F 1605SWMST094-F 1605GWMMW026-F 1605GWMMW021-F 1605GWMMW006-F 1605GWMMW16A-F)	Sulfate	67 (90-110)	63 (90-110)	J- (all detects)	A

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
1605SWMSG005-FMS/MSD (1605SWMST019-F 1605SWMST050-F 1605SWMDS030-1-F 1605SWMDS030-2-F 1605SWMST092-F 1605SWMST089-F 1605SWMST090-F 1605SWMST096-F 1605SWMSG004-F 1605SWMSG005-F 1605SWMST094-F 1605GWMMW026-F 1605GWMMW021-F 1605GWMMW006-F 1605GWMMW16A-F)	Sulfate	43 (90-110)	66 (90-110)	J- (all detects)	A

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG 10348364

Sample	Analyte	Flag	A or P	Reason (Code)
1605SWMST019-F 1605SWMST050-F 1605SWMDS030-1-F 1605SWMDS030-2-F 1605SWMST092-F 1605SWMST089-F 1605SWMST090-F 1605SWMST096-F 1605SWMSG004-F 1605SWMSG005-F 1605SWMST094-F 1605GWMMW026-F 1605GWMMW021-F 1605GWMMW006-F 1605GWMMW16A-F	Sulfate	J- (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (16)

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 10348364

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG 10348364

No Sample Data Qualified in this SDG

LDC #: 36509C6
SDG #: 10348364
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/1/16
Page: 1 of 2
Reviewer: SD
2nd Reviewer: W

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	5/9-10/16
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Laboratory Blanks	SW	
V.	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MSD = (32, 33) (35, 36)
VII.	Duplicate sample analysis	SW	DUP
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	1605SWMST019-U	10348364001	Water	05/09/16
2	1605SWMST050-U	10348364003	Water	05/09/16
3	1605SWMDS030-1-U	10348364005	Water	05/10/16
4	1605SWMDS030-2-U	10348364007	Water	05/10/16
5	1605SWMST092-U	10348364009	Water	05/10/16
6	1605SWMST089-U	10348364011	Water	05/10/16
7	1605SWMST090-U	10348364013	Water	05/10/16
8	1605SWMST096-U	10348364015	Water	05/10/16
9	1605SWMSG004-U	10348364017	Water	05/10/16
10	1605SWMSG005-U	10348364019	Water	05/10/16
11	1605SWMST094-U	10348364021	Water	05/10/16
12	1605GWMMW026-U	10348364023	Water	05/10/16
13	1605GWMMW021-U	10348364025	Water	05/10/16
14	1605GWMMW006-U	10348364027	Water	05/10/16
15	1605GWMMW16A-U	10348364029	Water	05/10/16
16	1605SWMST019-F	10348364002	Water	05/09/16
17	1605SWMST050-F	10348364004	Water	05/09/16

LDC #: 36509C6
 SDG #: 10348364
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 2/11/16
 Page: 2 of 2
 Reviewer: SD
 2nd Reviewer: 2

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID	Lab ID	Matrix	Date
18	1605SWMDS030-1-F	10348364006	Water	05/10/16
19	1605SWMDS030-2-F	10348364008	Water	05/10/16
20	1605SWMST092-F	10348364010	Water	05/10/16
21	1605SWMST089-F	10348364012	Water	05/10/16
22	1605SWMST090-F	10348364014	Water	05/10/16
23	1605SWMST096-F	10348364016	Water	05/10/16
24	1605SWMSG004-F	10348364018	Water	05/10/16
25	1605SWMSG005-F	10348364020	Water	05/10/16
26	1605SWMST094-F	10348364022	Water	05/10/16
27	1605GWMMW026-F	10348364024	Water	05/10/16
28	1605GWMMW021-F	10348364026	Water	05/10/16
29	1605GWMMW006-F	10348364028	Water	05/10/16
30	1605GWMW16A-F	10348364030	Water	05/10/16
31	1605SWMST089-UDUP	10348364011DUP	Water	05/10/16
32	1605SWMST089-FMS	10348364012MS	Water	05/10/16
33	1605SWMST089-FMSD	10348364012MSD	Water	05/10/16
34	1605SWMSG005-UDUP	10348364019DUP	Water	05/10/16
35	1605SWMSG005-FMS	10348364020MS	Water	05/10/16
36	1605SWMSG005-FMSD	10348364020MSD	Water	05/10/16
37				
38				
39				
40				
41				

Notes:

All circled methods are applicable to each sample.

[illegible]

Comments: _____

LDC #: 36509C6**VALIDATION FINDINGS WORKSHEET**
BlanksPage: 1 of 1Reviewer: SD2nd Reviewer: g**METHOD:** Inorganics, Method See Cover**Conc. units:** mg/L**Associated Samples:** 10, 14-15

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qualifiers									
TDS	5.0		25										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

<u>Y</u> <u>N</u> <u>N/A</u>	Was a matrix spike analyzed for each matrix in this SDG?
<u>Y</u> <u>N</u> <u>N/A</u>	Were matrix spike percent recoveries (%R) within the control limits of 80-120? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
<u>Y</u> <u>N</u> <u>N/A</u>	Were all duplicate sample relative percent differences (RPD) $\leq 20\%$ for samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

[illegible]

Comments: _____

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10348833

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMST132-1-U	05/13/16	10348833001
1605SWMST132-2-U	05/13/16	10348833003
1605SWMST131-U	05/13/16	10348833005
1605SWMST128-U	05/13/16	10348833007
1605SWMST143-U	05/13/16	10348833009
1605SWMST274-U	05/13/16	10348833011
1605SWMST133-U	05/13/16	10348833013
1605SWMST144-U	05/13/16	10348833015
1605SWMDS025-U	05/13/16	10348833017
1605SWMDS026-U	05/13/16	10348833019
1605GWMBW087-U	05/14/16	10348833021
1605GWMBW085-U	05/14/16	10348833023
1605GWMBW048-U	05/14/16	10348833025
1605GWMBW131-U	05/14/16	10348833027
1605GWMBW135-U	05/14/16	10348833029
1605GWMMW034-1-U	05/14/16	10348833031
1605GWMMW034-1-F	05/14/16	10348833032
1605SWMST132-1-F	05/13/16	10348833002
1605SWMST132-2-F	05/13/16	10348833004
1605SWMST131-F	05/13/16	10348833006
1605SWMST128-F	05/13/16	10348833008
1605SWMST143-F	05/13/16	10348833010
1605SWMST274-F	05/13/16	10348833012
1605SWMST133-F	05/13/16	10348833014
1605SWMST144-F	05/13/16	10348833016

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMDS025-F	05/13/16	10348833018
1605SWMDS026-F	05/13/16	10348833020
1605GWMBW087-F	05/14/16	10348833022
1605GWMBW085-F	05/14/16	10348833024
1605GWMBW048-F	05/14/16	10348833026
1605GWMBW131-F	05/14/16	10348833028
1605GWMBW135-F	05/14/16	10348833030

Introduction

This data review covers 32 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Calcium, Magnesium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UU | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for manganese are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Cadmium	0.024 ug/L	1605SWMST132-1-F 1605SWMST132-2-F 1605SWMST131-F 1605SWMST128-F

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Cadmium	0.020 ug/L	1605SWMST143-F 1605SWMST274-F 1605SWMST133-F 1605SWMST144-F 1605SWMDS025-F
ICB/CCB	Cadmium	0.028 ug/L	1605SWMDS026-F
ICB/CCB	Cadmium	0.023 ug/L	1605GWMBW087-U 1605GWMBW085-U 1605GWMBW048-U 1605GWMBW131-U 1605GWMBW135-U 1605GWMMW034-1-U

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1605SWMST132-1-F	Cadmium	0.030 ug/L	0.030U ug/L
1605SWMST131-F	Cadmium	0.019 ug/L	0.019U ug/L
1605SWMST143-F	Cadmium	0.087 ug/L	0.087J+ ug/L
1605SWMST274-F	Cadmium	0.016 ug/L	0.016U ug/L
1605SWMST133-F	Cadmium	0.025 ug/L	0.025U ug/L
1605SWMST144-F	Cadmium	0.065 ug/L	0.065U ug/L
1605GWMBW087-U	Cadmium	0.038 ug/L	0.038U ug/L
1605GWMBW085-U	Cadmium	0.015 ug/L	0.015U ug/L
1605GWMBW135-U	Cadmium	0.028 ug/L	0.028U ug/L

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

For 1605GWMMW036-FMS/MSD (from SDG 10348833) no data were qualified for Calcium and Magnesium percent recoveries outside the QC limits since the parent sample results were greater than 4X the spike concentration.

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of $\pm 10\%$ difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 10348833

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG 10348833

Sample	Analyte	Modified Final Concentration	A or P	Code
1605SWMST132-1-F	Cadmium	0.030U ug/L	A	10
1605SWMST131-F	Cadmium	0.019U ug/L	A	10
1605SWMST143-F	Cadmium	0.087J+ ug/L	A	10
1605SWMST274-F	Cadmium	0.016U ug/L	A	10
1605SWMST133-F	Cadmium	0.025U ug/L	A	10
1605SWMST144-F	Cadmium	0.065U ug/L	A	10
1605GWMBW087-U	Cadmium	0.038U ug/L	A	10
1605GWMBW085-U	Cadmium	0.015U ug/L	A	10
1605GWMBW135-U	Cadmium	0.028U ug/L	A	10

Metals - Field Blank Data Qualification Summary - SDG 10348833

No Sample Data Qualified in this SDG

LDC #: 36509D45
 SDG #: 10348833
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 7/11/16
 Page: 1 of 1
 Reviewer: SD
 2nd Reviewer: SD

METHOD: Metals (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	5/13-14/16
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	SW	MSD = SW
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet

ND = No compounds detected
 R = Rinsate
 FB = Field blank

D = Duplicate
 TB = Trip blank
 EB = Equipment blank

SB=Source blank
 OTHER:

	Client ID	Lab ID	Matrix	Date
1	1605SWMST132-1-U	10348833001	Water	05/13/16
2	1605SWMST132-2-U	10348833003	Water	05/13/16
3	1605SWMST131-U	10348833005	Water	05/13/16
4	1605SWMST128-U	10348833007	Water	05/13/16
5	1605SWMST143-U	10348833009	Water	05/13/16
6	1605SWMST274-U	10348833011	Water	05/13/16
7	1605SWMST133-U	10348833013	Water	05/13/16
8	1605SWMST144-U	10348833015	Water	05/13/16
9	1605SWMDS025-U	10348833017	Water	05/13/16
10	1605SWMDS026-U	10348833019	Water	05/13/16
11	1605GWMBW087-U -	10348833021	Water	05/14/16
12	1605GWMBW085-U	10348833023	Water	05/14/16
13	1605GWMBW048-U	10348833025	Water	05/14/16
14	1605GWMBW131-U	10348833027	Water	05/14/16
15	1605GWMBW135-U	10348833029	Water	05/14/16

LDC #: 36509D4a
 SDG #: 10348833
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET
 Stage 2B

Date: 7/1/16
 Page: 2 of 2
 Reviewer: SS
 2nd Reviewer: ca

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
16	1605GWMMW034-1-U <i>cd, Mn, Se</i>	10348833031	Water	05/14/16
17	1605GWMMW034-1-F <i>(Se only) cd, Se, Ca, Mg</i>	10348833032	Water	05/14/16
18	1605SWMST132-1-F	10348833002	Water	05/13/16
19	1605SWMST132-2-F	10348833004	Water	05/13/16
20	1605SWMST131-F	10348833006	Water	05/13/16
21	1605SWMST128-F	10348833008	Water	05/13/16
22	1605SWMST143-F	10348833010	Water	05/13/16
23	1605SWMST274-F	10348833012	Water	05/13/16
24	1605SWMST133-F	10348833014	Water	05/13/16
25	1605SWMST144-F	10348833016	Water	05/13/16
26	1605SWMDS025-F	10348833018	Water	05/13/16
27	1605SWMDS026-F	10348833020	Water	05/13/16
28	1605GWMBW087-F <i>Se only</i>	10348833022	Water	05/14/16
29	1605GWMBW085-F	10348833024	Water	05/14/16
30	1605GWMBW048-F	10348833026	Water	05/14/16
31	1605GWMBW131-F	10348833028	Water	05/14/16
32	1605GWMBW135-F	10348833030	Water	05/14/16
33				
34				
35				
36				
37				

Notes: _____

All circled elements are applicable to each sample.

[illegible]

Comments: Mercury by CVAA if performed

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)

Soil preparation factor applied: _____

Sample Concentration units, unless otherwise noted: _____

ug/L

Associated Samples: _____

18-21

(10)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	18	20								
Cd			0.024	0.12	0.030	0.019								

Sample Concentration units, unless otherwise noted: _____

ug/L

Associated Samples: _____

22-26

(10)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	22	23	24	25						
Cd			0.020	0.1	0.087J+	0.016	0.025	0.065						

Sample Concentration units, unless otherwise noted: _____

ug/L

Associated Samples: _____

27

(10)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	No Qual.									
Cd			0.028	0.14										

Sample Concentration units, unless otherwise noted: _____

ug/L

Associated Samples: _____

11-16

(10)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	11	12	15	16						
Cd			0.023	0.115	0.038	0.015	0.028							

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y	N	N/A	Was a matrix spike analyzed for each matrix in this SDG?
Y	N	N/A	Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
Y	N	N/A	Were all duplicate sample relative percent differences (RPD) $\leq 20\%$ for samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

[illegible]

Comments: MS/D: 1605GWMMW036-UMS/D (SDG: 10348833)
1605GWMMW018-FMS/D (SDG: 10348356)

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10348833

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMST132-1-U	05/13/16	10348833001
1605SWMST132-2-U	05/13/16	10348833003
1605SWMST131-U	05/13/16	10348833005
1605SWMST128-U	05/13/16	10348833007
1605SWMST143-U	05/13/16	10348833009
1605SWMST274-U	05/13/16	10348833011
1605SWMST133-U	05/13/16	10348833013
1605SWMST144-U	05/13/16	10348833015
1605SWMDS025-U	05/13/16	10348833017
1605SWMDS026-U	05/13/16	10348833019
1605GWMBW087-U	05/14/16	10348833021
1605GWMBW085-U	05/14/16	10348833023
1605GWMBW048-U	05/14/16	10348833025
1605GWMBW131-U	05/14/16	10348833027
1605GWMBW135-U	05/14/16	10348833029
1605GWMMW034-1-U	05/14/16	10348833031
1605GWMMW034-1-F	05/14/16	10348833032
1605SWMST132-1-F	05/13/16	10348833002
1605SWMST132-2-F	05/13/16	10348833004
1605SWMST131-F	05/13/16	10348833006
1605SWMST128-F	05/13/16	10348833008
1605SWMST143-F	05/13/16	10348833010
1605SWMST274-F	05/13/16	10348833012
1605SWMST133-F	05/13/16	10348833014
1605SWMST144-F	05/13/16	10348833016

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMDS025-F	05/13/16	10348833018
1605SWMDS026-F	05/13/16	10348833020
1605GWMBW087-F	05/14/16	10348833022
1605GWMBW085-F	05/14/16	10348833024
1605GWMBW048-F	05/14/16	10348833026
1605GWMBW131-F	05/14/16	10348833028
1605GWMBW135-F	05/14/16	10348833030
1605GWMBW087-FMS	05/14/16	10348833022MS
1605GWMBW087-FMSD	05/14/16	10348833022MSD

Introduction

This data review covers 34 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UJ | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 6 standard curve produced a coefficient of determination (r^2) of > 0.990 . The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Sulfate	0.44 mg/L	1605SWMST132-1-F 1605SWMST132-2-F 1605SWMST131-F 1605SWMST128-F 1605SWMST143-F 1605SWMST274-F 1605SWMST133-F

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater ($>5X$ blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1605SWMST143-F	Sulfate	1.4 mg/L	1.4J+ mg/L

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
1605GWMW018-FMS/MSD (1605SWMST132-1-F 1605SWMST132-2-F 1605SWMST131-F 1605SWMST128-F 1605SWMST143-F 1605SWMST274-F 1605SWMST133-F 1605SWMST144-F 1605SWMDS025-F 1605SWMDS026-F)	Sulfate	61 (90-110)	53 (90-110)	J- (all detects)	A
1605SWMT066-FMS/MSD (1605SWMST132-1-F 1605SWMST132-2-F 1605SWMST131-F 1605SWMST128-F 1605SWMST143-F 1605SWMST274-F 1605SWMST133-F 1605SWMST144-F 1605SWMDS025-F 1605SWMDS026-F)	Sulfate	22 (90-110)	49 (90-110)	J- (all detects)	A

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
1605GWMMW007-FMS/MSD (1605GWMMW034-1-F 1605GWMBW087-F 1605GWMBW085-F 1605GWMBW048-F 1605GWMBW131-F 1605GWMBW135-F)	Sulfate	70 (90-110)	70 (90-110)	J- (all detects)	A
1605GWMBW087-FMS/MSD (1605GWMMW034-1-F 1605GWMBW087-F 1605GWMBW085-F 1605GWMBW048-F 1605GWMBW131-F 1605GWMBW135-F)	Sulfate	84 (90-110)	82 (90-110)	J- (all detects)	A

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG 10348833

Sample	Analyte	Flag	A or P	Reason (Code)
1605GWMMW034-1-F 1605SWMST132-1-F 1605SWMST132-2-F 1605SWMST131-F 1605SWMST128-F 1605SWMST143-F 1605SWMST274-F 1605SWMST133-F 1605SWMST144-F 1605SWMDS025-F 1605SWMDS026-F 1605GWMBW087-F 1605GWMBW085-F 1605GWMBW048-F 1605GWMBW131-F 1605GWMBW135-F	Sulfate	J- (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (16)

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 10348833

Sample	Analyte	Modified Final Concentration	A or P	Code
1605SWMST143-F	Sulfate	1.4J+ mg/L	A	10

Wet Chemistry - Field Blank Data Qualification Summary - SDG 10348833

No Sample Data Qualified in this SDG

LDC #: 36509D6
SDG #: 10348833
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 7/13/16
Page: 1 of 2
Reviewer: JSD
2nd Reviewer: A

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	5/13/16 - 5/14/16
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Laboratory Blanks	SW	
V.	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	
VII.	Duplicate sample analysis	A	DUP = 1605GWMMW007-UDUP (SDG: 103488339)
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	1605SWMST132-1-U	10348833001	Water	05/13/16
2	1605SWMST132-2-U	10348833003	Water	05/13/16
3	1605SWMST131-U	10348833005	Water	05/13/16
4	1605SWMST128-U	10348833007	Water	05/13/16
5	1605SWMST143-U	10348833009	Water	05/13/16
6	1605SWMST274-U	10348833011	Water	05/13/16
7	1605SWMST133-U	10348833013	Water	05/13/16
8	1605SWMST144-U	10348833015	Water	05/13/16
9	1605SWMDS025-U	10348833017	Water	05/13/16
10	1605SWMDS026-U	10348833019	Water	05/13/16
11	1605GWMBW087-U	10348833021	Water	05/14/16
12	1605GWMBW085-U	10348833023	Water	05/14/16
13	1605GWMBW048-U	10348833025	Water	05/14/16
14	1605GWMBW131-U	10348833027	Water	05/14/16
15	1605GWMBW135-U	10348833029	Water	05/14/16
16	1605GWMMW034-1-U	10348833031	Water	05/14/16
17	1605GWMMW034-1-F	10348833032	Water	05/14/16

LDC #: 36509D6
SDG #: 10348833
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 7/1/14
Page: 2 of 2
Reviewer: SS
2nd Reviewer: [Signature]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID	Lab ID	Matrix	Date
18	1605SWMST132-1-F	10348833002	Water	05/13/16
19	1605SWMST132-2-F	10348833004	Water	05/13/16
20	1605SWMST131-F	10348833006	Water	05/13/16
21	1605SWMST128-F	10348833008	Water	05/13/16
22	1605SWMST143-F	10348833010	Water	05/13/16
23	1605SWMST274-F	10348833012	Water	05/13/16
24	1605SWMST133-F	10348833014	Water	05/13/16
25	1605SWMST144-F	10348833016	Water	05/13/16
26	1605SWMDS025-F	10348833018	Water	05/13/16
27	1605SWMDS026-F	10348833020	Water	05/13/16
28	1605GWMBW087-F	10348833022	Water	05/14/16
29	1605GWMBW085-F	10348833024	Water	05/14/16
30	1605GWMBW048-F	10348833026	Water	05/14/16
31	1605GWMBW131-F	10348833028	Water	05/14/16
32	1605GWMBW135-F	10348833030	Water	05/14/16
33	1605GWMBW087-FMS	10348833022MS	Water	05/14/16
34	1605GWMBW087-FMSD	10348833022MSD	Water	05/14/16
35				
36				
37				
38				
39				

Notes: _____

All circled methods are applicable to each sample.

[illegible]

Comments:

LDC #: 36509D6**VALIDATION FINDINGS WORKSHEET**
BlanksPage: 1 of 1Reviewer: SD2nd Reviewer: g**METHOD:** Inorganics, Method See Cover**Conc. units:** mg/L**Associated Samples:** 18-24 (10)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		22									
SO4		0.44	2.2	1.4J+									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

☒ N/A Was a matrix spike analyzed for each matrix in this SDG? 40-110
☒ N/A Were matrix spike percent recoveries (%R) within the control limits of ~~80-120~~? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. SD
☒ N/A Were all duplicate sample relative percent differences (RPD) $\leq 20\%$ for samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

[illegible]

Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10348839

Sample Identification	Collection Date	Laboratory Sample Identification
1605GWMBW130-U	05/15/16	10348839001
1605GWMBW027-U	05/15/16	10348839003
1605GWMBW028-U	05/15/16	10348839005
1605GWMBW011-U	05/15/16	10348839007
1605GWMBW009-U	05/15/16	10348839009
1605GWMMW025-U	05/14/16	10348839012
1605GWMBW099-U	05/14/16	10348839014
1605GWMMW024-U	05/14/16	10348839016
1605GWMMW013-U	05/14/16	10348839018
1605GWMMW034-2-U	05/14/16	10348839020
1605GWMMW031-U	05/13/16	10348839023
1605GWMMW007-U	05/14/16	10348839025
1605GWMMW009-U	05/13/16	10348839027
1605GWMMW027-U	05/13/16	10348839029
1605GWMMW035-U	05/13/16	10348839031
1605GWMMW037-1-U	05/13/16	10348839033
1605GWMMW037-2-U	05/13/16	10348839035
1605GWMMW036-U	05/13/16	10348839037
1605GWMMW032-U	05/15/16	10348839039
1605GWMMW020-U	05/15/16	10348839041
1605GWMW15A-U	05/15/16	10348839043
1605GWMMW030-U	05/15/16	10348839045
1605GWMBW006-U	05/15/16	10348839047
1605GWMBW130-F	05/15/16	10348839002
1605GWMBW027-F	05/15/16	10348839004

Sample Identification	Collection Date	Laboratory Sample Identification
1605GWMBW028-F	05/15/16	10348839006
1605GWMBW011-F	05/15/16	10348839008
1605GWMBW009-F	05/15/16	10348839010
1605GWMMW025-F	05/14/16	10348839011
1605GWMBW099-F	05/14/16	10348839013
1605GWMMW024-F	05/14/16	10348839015
1605GWMMW013-F	05/14/16	10348839017
1605GWMMW034-2-F	05/14/16	10348839019
1605GWMMW031-F	05/13/16	10348839022
1605GWMMW007-F	05/14/16	10348839024
1605GWMMW009-F	05/13/16	10348839026
1605GWMMW027-F	05/13/16	10348839028
1605GWMMW035-F	05/13/16	10348839030
1605GWMMW037-1-F	05/13/16	10348839032
1605GWMMW037-2-F	05/13/16	10348839034
1605GWMMW036-F	05/13/16	10348839036
1605GWMMW032-F	05/15/16	10348839038
1605GWMMW020-F	05/15/16	10348839040
1605GWMMW15A-F	05/15/16	10348839042
1605GWMMW030-F	05/15/16	10348839044
1605GWMMW006-F	05/15/16	10348839046
1605GWMMW007-UMS	05/14/16	10348839025MS
1605GWMMW007-UMSD	05/14/16	10348839025MSD
1605GWMMW036-UMS	05/13/16	10348839037MS
1605GWMMW036-UMSD	05/13/16	10348839037MSD
1605GWMMW007-FMS	05/14/16	10348839024MS
1605GWMMW007-FMSD	05/14/16	10348839024MSD
1605GWMMW036-FMS	05/13/16	10348839036MS
1605GWMMW036-FMSD	05/13/16	10348839036MSD

Introduction

This data review covers 32 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UJ | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Level IV review only).

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for manganese are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Cadmium	0.021 ug/L	1605GWMBW130-U 1605GWMBW027-U 1605GWMBW028-U 1605GWMBW011-U 1605GWMBW009-U 1605GWMMW025-U 1605GWMBW099-U 1605GWMMW024-U 1605GWMMW013-U 1605GWMMW034-2-U 1605GWMMW031-U 1605GWMMW007-U 1605GWMMW009-U 1605GWMMW027-U 1605GWMMW035-U 1605GWMMW037-1-U 1605GWMMW037-2-U 1605GWMMW030-U 1605GWMBW006-U
ICB/CCB	Cadmium	0.046 ug/L	1605GWMBW130-U 1605GWMBW027-U 1605GWMBW028-U 1605GWMBW011-U 1605GWMBW009-U 1605GWMMW025-U 1605GWMBW099-U 1605GWMMW024-U
ICB/CCB	Cadmium	0.055 ug/L	1605GWMMW013-U 1605GWMMW034-2-U 1605GWMMW031-U 1605GWMMW007-U 1605GWMMW009-U 1605GWMMW027-U 1605GWMMW035-U 1605GWMMW037-1-U 1605GWMMW037-2-U 1605GWMMW030-U 1605GWMBW006-U
ICB/CCB	Cadmium	0.023 ug/L	1605GWMMW036-U
ICB/CCB	Cadmium	0.021 ug/L	1605GWMMW032-U 1605GWMMW020-U 1605GWMMW15A-U

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1605GWMBW099-U	Cadmium	0.054 ug/L	0.054U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
1605GWMMW007-U	Cadmium	0.015 ug/L	0.015U ug/L
1605GWMBW006-U	Cadmium	0.027 ug/L	0.027U ug/L
1605GWMBW011-U	Cadmium	0.13 ug/L	0.13J+ ug/L
1605GWMBW009-U	Cadmium	0.11 ug/L	0.11J+ ug/L
1605GWMMW009-U	Cadmium	0.21 ug/L	0.21J+ ug/L
1605GWMMW027-U	Cadmium	0.16 ug/L	0.16J+ ug/L
1605GWMMW036-U	Cadmium	0.018 ug/L	0.018U ug/L

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of $\pm 10\%$ difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 10348839

No Sample Data Qualified in this SDG

Metals - Laboratory Blank Data Qualification Summary - SDG 10348839

Sample	Analyte	Modified Final Concentration	A or P	Code
1605GWMBW099-U	Cadmium	0.054U ug/L	A	10, 11
1605GWMMW007-U	Cadmium	0.015U ug/L	A	10, 11
1605GWMBW006-U	Cadmium	0.027U ug/L	A	10, 11
1605GWMBW011-U	Cadmium	0.13J+ ug/L	A	10
1605GWMBW009-U	Cadmium	0.11J+ ug/L	A	10
1605GWMMW009-U	Cadmium	0.21J+ ug/L	A	10
1605GWMMW027-U	Cadmium	0.16J+ ug/L	A	10
1605GWMMW036-U	Cadmium	0.018U ug/L	A	10

Metals - Field Blank Data Qualification Summary - SDG 10348839

No Sample Data Qualified in this SDG

LDC #: 36509E43
 SDG #: 10348839
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 7/5/16
 Page: 1 of 3
 Reviewer: SD
 2nd Reviewer: G

METHOD: Metals (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	5/13-15/16
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MSID = (47.48) (49.50) (51.52) (53.54)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	N	
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet

ND = No compounds detected
 R = Rinsate
 FB = Field blank

D = Duplicate
 TB = Trip blank
 EB = Equipment blank

SB=Source blank
 OTHER:

	Client ID	Lab ID	Matrix	Date
1	1605GWMBW130-U	10348839001	Water	05/15/16
2	1605GWMBW027-U	10348839003	Water	05/15/16
3	1605GWMBW028-U	10348839005	Water	05/15/16
4	1605GWMBW011-U	10348839007	Water	05/15/16
5	1605GWMBW009-U	10348839009	Water	05/15/16
6	1605GWMMW025-U	10348839012	Water	05/14/16
7	1605GWMBW099-U	10348839014	Water	05/14/16
8	1605GWMMW024-U	10348839016	Water	05/14/16
9	1605GWMMW013-U	10348839018	Water	05/14/16
10	1605GWMMW034-2-U	10348839020	Water	05/14/16
11	1605GWMMW031-U	10348839023	Water	05/13/16
12	1605GWMMW007-U	10348839025	Water	05/13/16
13	1605GWMMW009-U	10348839027	Water	05/13/16
14	1605GWMMW027-U	10348839029	Water	05/13/16
15	1605GWMMW035-U	10348839031	Water	05/13/16

LDC #: 36509E4b
 SDG #: 10348839
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET
 Stage 2B

Date: 7/5/16
 Page: 2 of 3
 Reviewer: SD
 2nd Reviewer: 2

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
16	1605GWMMW037-1-U	10348839033	Water	05/13/16
17	1605GWMMW037-2-U	10348839035	Water	05/13/16
18	1605GWMMW036-U	10348839037	Water	05/13/16
19	1605GWMMW032-U	10348839039	Water	05/15/16
20	1605GWMMW020-U	10348839041	Water	05/15/16
21	1605GWMMW15A-U	10348839043	Water	05/15/16
22	1605GWMMW030-U	10348839045	Water	05/15/16
23	1605GWMBW006-U	10348839047	Water	05/15/16
24	1605GWMBW130-F	10348839002	Water	05/15/16
25	1605GWMBW027-F	10348839004	Water	05/15/16
26	1605GWMBW028-F	10348839006	Water	05/15/16
27	1605GWMBW011-F	10348839008	Water	05/15/16
28	1605GWMBW009-F	10348839010	Water	05/15/16
29	1605GWMMW025-F	10348839011	Water	05/14/16
30	1605GWMBW099-F	10348839013	Water	05/14/16
31	1605GWMMW024-F	10348839015	Water	05/14/16
32	1605GWMMW013-F	10348839017	Water	05/14/16
33	1605GWMMW034-2-F	10348839019	Water	05/14/16
34	1605GWMMW031-F	10348839022	Water	05/13/16
35	1605GWMMW007-F	10348839024	Water	05/13/16
36	1605GWMMW009-F	10348839026	Water	05/13/16
37	1605GWMMW027-F	10348839028	Water	05/13/16
38	1605GWMMW035-F	10348839030	Water	05/13/16
39	1605GWMMW037-1-F	10348839032	Water	05/13/16
40	1605GWMMW037-2-F	10348839034	Water	05/13/16
41	1605GWMMW036-F	10348839036	Water	05/13/16
42	1605GWMMW032-F	10348839038	Water	05/15/16
43	1605GWMMW020-F	10348839040	Water	05/15/16
44	1605GWMMW15A-F	10348839042	Water	05/15/16
45	1605GWMMW030-F	10348839044	Water	05/15/16
46	1605GWMMW006-F	10348839046	Water	05/15/16
47	1605GWMMW007-UMS	10348839025MS	Water	05/13/16
48	1605GWMMW007-UMSD	10348839025MSD	Water	05/13/16
49	1605GWMMW036-UMS	10348839037MS	Water	05/13/16
50	1605GWMMW036-UMSD	10348839037MSD	Water	05/13/16

LDC #: 36509E4b
SDG #: 10348839
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 7/5/16
Page: 3 of 3
Reviewer: [Signature]
2nd Reviewer: [Signature]

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
51	1605GWMMW007-FMS	10348839024MS	Water	05/13/16
52	1605GWMMW007-FMSD	10348839024MSD	Water	05/13/16
53	1605GWMMW036-FMS	10348839036MS	Water	05/13/16
54	1605GWMMW036-FMSD	10348839036MSD	Water	05/13/16
55				
56				
57				
58				
59				

Notes: _____

[illegible]

ELEMENTS.wpd

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)

Soil preparation factor applied: Sample Concentration units, unless otherwise noted:

ug/L

Associated Samples:

1-17, 22-23

(1-)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	7	12	23							
Cd		0.021		0.105	0.054	0.015	0.027							

Sample Concentration units, unless otherwise noted:

ug/L

Associated Samples:

1-8

(10)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	4	5	7							
Cd			0.046	0.23	0.13J+	0.11J+	See PB							

Sample Concentration units, unless otherwise noted:

ug/L

Associated Samples:

9-17, 22-23

(10)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	12	13	14	23						
Cd			0.055	0.275	See PB	0.21J+	0.16J+	See PB						

Sample Concentration units, unless otherwise noted:

ug/L

Associated Samples:

18

(10)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	18									
Cd			0.023	0.115	0.018									

Sample Concentration units, unless otherwise noted:

ug/L

Associated Samples:

19-21

(10)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	No Qual.									
Cd			0.021	0.105										

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10348839

Sample Identification	Collection Date	Laboratory Sample Identification
1605GWMBW130-U	05/15/16	10348839001
1605GWMBW027-U	05/15/16	10348839003
1605GWMBW028-U	05/15/16	10348839005
1605GWMBW011-U	05/15/16	10348839007
1605GWMBW009-U	05/15/16	10348839009
1605GWMMW025-U	05/14/16	10348839012
1605GWMBW099-U	05/14/16	10348839014
1605GWMMW024-U	05/14/16	10348839016
1605GWMMW013-U	05/14/16	10348839018
1605GWMMW034-2-U	05/14/16	10348839020
1605GWMMW031-U	05/13/16	10348839023
1605GWMMW007-U	05/14/16	10348839025
1605GWMMW009-U	05/13/16	10348839027
1605GWMMW027-U	05/13/16	10348839029
1605GWMMW035-U	05/13/16	10348839031
1605GWMMW037-1-U	05/13/16	10348839033
1605GWMMW037-2-U	05/13/16	10348839035
1605GWMMW036-U	05/13/16	10348839037
1605GWMMW032-U	05/15/16	10348839039
1605GWMMW020-U	05/15/16	10348839041
1605GWMW15A-U	05/15/16	10348839043
1605GWMMW030-U	05/15/16	10348839045
1605GWMBW006-U	05/15/16	10348839047
1605GWMBW130-F	05/15/16	10348839002
1605GWMBW027-F	05/15/16	10348839004

Sample Identification	Collection Date	Laboratory Sample Identification
1605GWMBW028-F	05/15/16	10348839006
1605GWMBW011-F	05/15/16	10348839008
1605GWMBW009-F	05/15/16	10348839010
1605GWMMW025-F	05/14/16	10348839011
1605GWMBW099-F	05/14/16	10348839013
1605GWMMW024-F	05/14/16	10348839015
1605GWMMW013-F	05/14/16	10348839017
1605GWMMW034-2-F	05/14/16	10348839019
1605GWMMW031-F	05/13/16	10348839022
1605GWMMW007-F	05/14/16	10348839024
1605GWMMW009-F	05/13/16	10348839026
1605GWMMW027-F	05/13/16	10348839028
1605GWMMW035-F	05/13/16	10348839030
1605GWMMW037-1-F	05/13/16	10348839032
1605GWMMW037-2-F	05/13/16	10348839034
1605GWMMW036-F	05/13/16	10348839036
1605GWMMW032-F	05/15/16	10348839038
1605GWMMW020-F	05/15/16	10348839040
1605GWMW15A-F	05/15/16	10348839042
1605GWMMW030-F	05/15/16	10348839044
1605GWMMW006-F	05/15/16	10348839046
1605GWMMW007-FMS	05/14/16	10348839024MS
1605GWMMW007-FMSD	05/14/16	10348839024MSD
1605GWMMW036-FMS	05/13/16	10348839036MS
1605GWMMW036-FMSD	05/13/16	10348839036MSD

Introduction

This data review covers 50 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the methods noted below:

- EPA Method 300.0 for Sulfate and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UJ | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 6 standard curve produced a coefficient of determination (r^2) of > 0.990 . The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Sulfate	0.44 mg/L	1605GWMMW027-F 1605GWMMW035-F 1605GWMMW020-F 1605GWMMW030-F 1605GWMMW006-F
PB (prep blank)	Total dissolved solids	8.0 mg/L	1605GWMBW130-U 1605GWMBW027-U 1605GWMBW028-U 1605GWMBW011-U 1605GWMBW009-U 1605GWMMW032-U 1605GWMMW020-U

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater ($>5X$ blank contaminants) than the concentrations found in the associated laboratory blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
1605GWMMW007-FMS/MSD (1605GWMBW130-F 1605GWMBW027-F 1605GWMBW028-F 1605GWMBW011-F 1605GWMBW009-F 1605GWMMW025-F 1605GWMBW099-F 1605GWMMW024-F 1605GWMMW013-F 1605GWMMW034-2-F 1605GWMMW007-F)	Sulfate	70 (90-110)	70 (90-110)	J- (all detects)	A
1605GWMMW036-FMS/MSD (1605GWMMW031-F 1605GWMMW009-F 1605GWMMW027-F 1605GWMMW035-F 1605GWMMW037-1-F 1605GWMMW037-2-F 1605GWMMW036-F 1605GWMMW032-F 1605GWMMW020-F 1605GWMMW030-F 1605GWMMW006-F)	Sulfate	76 (90-110)	-	J- (all detects)	A

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
1605GWMBW087-FMS/MSD (1605GWMBW130-F 1605GWMBW027-F 1605GWMBW028-F 1605GWMBW011-F 1605GWMBW009-F 1605GWMMW025-F 1605GWMBW099-F 1605GWMMW024-F 1605GWMMW013-F 1605GWMMW034-2-F 1605GWMMW007-F)	Sulfate	84 (90-110)	82 (90-110)	J- (all detects)	A

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG 10348839

Sample	Analyte	Flag	A or P	Reason (Code)
1605GWMBW130-F 1605GWMBW027-F 1605GWMBW028-F 1605GWMBW011-F 1605GWMBW009-F 1605GWMMW025-F 1605GWMBW099-F 1605GWMMW024-F 1605GWMMW013-F 1605GWMMW034-2-F 1605GWMMW031-F 1605GWMMW007-F 1605GWMMW009-F 1605GWMMW027-F 1605GWMMW035-F 1605GWMMW037-1-F 1605GWMMW037-2-F 1605GWMMW036-F 1605GWMMW032-F 1605GWMMW020-F 1605GWMMW030-F 1605GWMMW006-F	Sulfate	J- (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (16)

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 10348839

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG 10348839

No Sample Data Qualified in this SDG

LDC #: 36509E6
SDG #: 10348839
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 7/15/16
Page: 1 of 3
Reviewer: JD
2nd Reviewer: CN

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.4)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	5/13-15/16
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Laboratory Blanks	SW	
V.	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	MSID = 1605GWMBW027-FMSID (SDG: 10348839)
VII.	Duplicate sample analysis	A	DUP = 1605GWMW026-UDUP (SDG: 10348839)
VIII.	Laboratory control samples	A	LCSID
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI.	Overall assessment of data	A	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	1605GWMBW130-U	10348839001	Water	05/15/16
2	1605GWMBW027-U	10348839003	Water	05/15/16
3	1605GWMBW028-U	10348839005	Water	05/15/16
4	1605GWMBW011-U	10348839007	Water	05/15/16
5	1605GWMBW009-U	10348839009	Water	05/15/16
6	1605GWMMW025-U	10348839012	Water	05/14/16
7	1605GWMBW099-U	10348839014	Water	05/14/16
8	1605GWMMW024-U	10348839016	Water	05/14/16
9	1605GWMMW013-U	10348839018	Water	05/14/16
10	1605GWMMW034-2-U	10348839020	Water	05/14/16
11	1605GWMMW031-U	10348839023	Water	05/13/16
12	1605GWMMW007-U	10348839025	Water	05/13/16
13	1605GWMMW009-U	10348839027	Water	05/13/16
14	1605GWMMW027-U	10348839029	Water	05/13/16
15	1605GWMMW035-U	10348839031	Water	05/13/16
16	1605GWMMW037-1-U	10348839033	Water	05/13/16
17	1605GWMMW037-2-U	10348839035	Water	05/13/16

DUP = 1605GWMMW036-UDUP (SDG: 10348839)

LDC #: 36509E6
SDG #: 10348839
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B

Date: 7/5/16
Page: 2 of 3
Reviewer: JD
2nd Reviewer: [Signature]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID	Lab ID	Matrix	Date
18	1605GWMMW036-U	10348839037	Water	05/13/16
19	1605GWMMW032-U	10348839039	Water	05/15/16
20	1605GWMMW020-U	10348839041	Water	05/15/16
21	1605GWMMW15A-U	10348839043	Water	05/15/16
22	1605GWMMW030-U	10348839045	Water	05/15/16
23	1605GWMBW006-U	10348839047	Water	05/15/16
24	1605GWMBW130-F	10348839002	Water	05/15/16
25	1605GWMBW027-F	10348839004	Water	05/15/16
26	1605GWMBW028-F	10348839006	Water	05/15/16
27	1605GWMBW011-F	10348839008	Water	05/15/16
28	1605GWMBW009-F	10348839010	Water	05/15/16
29	1605GWMMW025-F	10348839011	Water	05/14/16
30	1605GWMBW099-F	10348839013	Water	05/14/16
31	1605GWMMW024-F	10348839015	Water	05/14/16
32	1605GWMMW013-F	10348839017	Water	05/14/16
33	1605GWMMW034-2-F	10348839019	Water	05/14/16
34	1605GWMMW031-F	10348839022	Water	05/13/16
35	1605GWMMW007-F	10348839024	Water	05/13/16
36	1605GWMMW009-F	10348839026	Water	05/13/16
37	1605GWMMW027-F	10348839028	Water	05/13/16
38	1605GWMMW035-F	10348839030	Water	05/13/16
39	1605GWMMW037-1-F	10348839032	Water	05/13/16
40	1605GWMMW037-2-F	10348839034	Water	05/13/16
41	1605GWMMW036-F	10348839036	Water	05/13/16
42	1605GWMMW032-F	10348839038	Water	05/15/16
43	1605GWMMW020-F	10348839040	Water	05/15/16
44	1605GWMMW15A-F	10348839042	Water	05/15/16
45	1605GWMMW030-F	10348839044	Water	05/15/16
46	1605GWMMW006-F	10348839046	Water	05/15/16
47	1605GWMMW031-FMS	10348839022MS	Water	05/13/16
48	1605GWMMW031-FMSD	10348839022MSD	Water	05/13/16
49	1605GWMMW007-FMS	10348839024MS	Water	05/13/16
50	1605GWMMW007-FMSD	10348839024MSD	Water	05/13/16
51	1605GWMMW036-FMS	10348839036MS	Water	05/13/16

LDC #: 36509E6

SDG #: 10348839

Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/5/16

Page: 3 of 3

Reviewer: JD

2nd Reviewer: [Signature]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID	Lab ID	Matrix	Date
52	1605GWMMW036-FMSD <i>SiO₂</i>	10348839036MSD	Water	05/13/16
53				
54				
55				
56				
57				

Notes:

All circled methods are applicable to each sample.

[illegible]

Comments: _____

VALIDATION FINDINGS WORKSHEET **Blanks**

METHOD: Inorganics, Method See Cover

Conc. units: mg/L

Associated Samples: 37-38, 43, 45, 46 (Dil: 37, 43, 46 = 5X; 38 = 10X) (10)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qualifiers									
SO4		0.44	2.2										

Conc. units: mg/L

Associated Samples: 1-5, 19-20 (11)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qualifiers									
TDS	8.0		40										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?
Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 90-110? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) $\leq 20\%$ for samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

[illegible]

Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B & 4

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10349184

Sample Identification	Collection Date	Laboratory Sample Identification
1605GWMMW028-1-U**	05/12/16	10349184001**
1605GWMMW023-U**	05/12/16	10349184003**
1605SWMDS034-U	05/12/16	10349184005
1605GWMMW022-U**	05/12/16	10349184007**
1605GWMMW011-U**	05/12/16	10349184009**
1605GWMMW010-U**	05/12/16	10349184011**
1605GWMMW028-2-U	05/12/16	10349184013
1605SWMST226-U**	05/12/16	10349184015**
1605SWMST044-U**	05/12/16	10349184017**
1605SWMST045-1-U**	05/12/16	10349184019**
1605SWMST275-U**	05/12/16	10349184021**
1605SWMST136-U	05/12/16	10349184023
1605SWMST045-2-U	05/12/16	10349184024
1605SWMST045-2-F	05/12/16	10349184025
1605SWMST136-F	05/12/16	10349184026
1605GWMMW028-1-F	05/12/16	10349184002
1605GWMMW023-F	05/12/16	10349184004
1605SWMDS034-F	05/12/16	10349184006
1605GWMMW022-F**	05/12/16	10349184008**
1605GWMMW011-F**	05/12/16	10349184010**
1605GWMMW010-F**	05/12/16	10349184012**
1605GWMMW028-2-F**	05/12/16	10349184014**
1605SWMST226-F**	05/12/16	10349184016**
1605SWMST044-F**	05/12/16	10349184018**
1605SWMST045-1-F**	05/12/16	10349184020**

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMST275-F**	05/12/16	10349184022**
1605SWMST226-UMS	05/12/16	10349184015MS
1605SWMST226-UMSD	05/12/16	10349184015MSD
1605SWMST226-FMS	05/12/16	10349184016MS
1605SWMST226-FMSD	05/12/16	10349184016MSD
1605SWMST275-FMS	05/12/16	10349184022MS
1605SWMST275-FMSD	05/12/16	10349184022MSD

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 32 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Calcium, Magnesium, Manganese, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UJ | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height (Stage 4 review only) with the following exceptions:

Date	Isotope	Mass Calibration (Limits)	Associated Samples	Affected Analyte	Flag	A or P
05/26/16	Magnesium ²⁴	23.85 (23.9-24.1 amu)	1605SWMST226-F**	Calcium	J (all detects)	P

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for manganese are 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

Magnesium results were outside the QC limits; data were not qualified since the sample concentration for sample 1605SWMDS034-F were greater than 2X the RLs.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Cadmium Magnesium	0.030 ug/L 3.7 ug/L	1605SWMST044-F** 1605SWMST275-F**
ICB/CCB	Cadmium	0.032 ug/L	1605SWMST044-F** 1605SWMST275-F**
ICB/CCB	Selenium	0.14 ug/L	1605GWMMW028-1-U** 1605GWMMW023-U** 1605SWMDS034-U 1605GWMMW022-U** 1605GWMMW011-U** 1605GWMMW010-U** 1605GWMMW028-2-U 1605SWMST226-U** 1605SWMST044-U** 1605SWMST045-1-U** 1605SWMST275-U** 1605SWMST136-U 1605SWMST045-2-U
PB (prep blank)	Cadmium Manganese	0.013 ug/L 0.38 ug/L	1605GWMMW022-U** 1605GWMMW011-U** 1605GWMMW010-U** 1605GWMMW028-2-U
ICB/CCB	Cadmium	0.038 ug/L	1605GWMMW022-U** 1605GWMMW011-U** 1605GWMMW010-U** 1605GWMMW028-2-U
ICB/CCB	Cadmium	0.035 ug/L	1605SWMDS034-F
PB (prep blank)	Selenium	0.23 ug/L	1605SWMST045-2-F 1605SWMST136-F 1605GWMMW028-1-F 1605GWMMW023-F 1605GWMMW022-F** 1605GWMMW011-F** 1605GWMMW010-F** 1605GWMMW028-2-F** 1605SWMST226-F** 1605SWMST045-1-F**
PB (prep blank)	Cadmium Calcium Magnesium	0.34 ug/L 18.3 ug/L 7.5 ug/L	1605SWMST045-2-F 1605SWMST136-F 1605SWMST226-F** 1605SWMST045-1-F**
ICB/CCB	Cadmium	0.023 ug/L	1605SWMST045-2-F 1605SWMST136-F 1605SWMST226-F** 1605SWMST045-1-F**

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1605SWMST044-F**	Cadmium	0.026 ug/L	0.026U ug/L
1605SWMST275-F**	Cadmium	0.022 ug/L	0.022U ug/L
1605GWMMW011-U**	Selenium Manganese	0.41 ug/L 0.27 ug/L	0.41U ug/L 0.27U ug/L
1605SWMST044-U**	Selenium	0.49 ug/L	0.49U ug/L
1605SWMST045-1-U**	Selenium	0.56 ug/L	0.56J+ ug/L
1605SWMST275-U**	Selenium	0.23 ug/L	0.23U ug/L
1605SWMST045-2-U	Selenium	0.48 ug/L	0.48U ug/L
1605GWMMW028-2-U	Cadmium	0.023 ug/L	0.023U ug/L
1605SWMDS034-F	Cadmium	0.068 ug/L	0.068U ug/L
1605SWMST045-2-F	Selenium Cadmium	0.54 ug/L 0.027 ug/L	0.54J+ ug/L 0.027U ug/L
1605GWMMW023-F	Selenium	0.18 ug/L	0.18U ug/L
1605GWMMW011-F**	Selenium	0.50 ug/L	0.50U ug/L
1605SWMST045-1-F**	Selenium Cadmium	0.59 ug/L 0.018 ug/L	0.59J+ ug/L 0.018U ug/L
1605SWMST136-F	Cadmium	0.061 ug/L	0.061U ug/L
1605SWMST226-F**	Cadmium	0.067 ug/L	0.067U ug/L

No field blanks were identified in this SDG.

V. ICP-MS Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

IX. ICP-MS Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of $\pm 10\%$ difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met.

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in triplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed.

The results for the dissolved metals sample analysis were greater than the total metals sample analysis as follows:

Analyte	Concentration (mg/L)	
	1509SWMDS026-U	1509SWMDS026-F
Selenium	0.0297	0.0421

Analyte	Concentration (mg/L)	
	1509SWMST019-1-U	1509SWMST019-1-F
Selenium	0.00246	0.00524

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Metals - Data Qualification Summary - SDG 10349184

Sample	Analyte	Flag	A or P	Reason (Code)
1605SWMST226-F**	Calcium	J (all detects)	P	Instrument tune (AMU) (5)

Metals - Laboratory Blank Data Qualification Summary - SDG 10349184

Sample	Analyte	Modified Final Concentration	A or P	Code
1605SWMST044-F**	Cadmium	0.026U ug/L	A	10, 11
1605SWMST275-F**	Cadmium	0.022U ug/L	A	10, 11
1605GWMMW011-U**	Selenium Manganese	0.41U ug/L 0.27U ug/L	A	11
1605SWMST044-U**	Selenium	0.49U ug/L	A	11
1605SWMST045-1-U**	Selenium	0.56J+ ug/L	A	11
1605SWMST275-U**	Selenium	0.23U ug/L	A	11
1605SWMST045-2-U	Selenium	0.48U ug/L	A	11
1605GWMMW028-2-U	Cadmium	0.023U ug/L	A	10, 11
1605SWMDS034-F	Cadmium	0.068U ug/L	A	10
1605SWMST045-2-F	Selenium Cadmium	0.54J+ ug/L 0.027U ug/L	A	10, 11
1605GWMMW023-F	Selenium	0.18U ug/L	A	11
1605GWMMW011-F**	Selenium	0.50U ug/L	A	10, 11
1605SWMST045-1-F**	Selenium Cadmium	0.59J+ ug/L 0.018U ug/L	A	10, 11
1605SWMST136-F	Cadmium	0.061U ug/L	A	10, 11
1605SWMST226-F**	Cadmium	0.067U ug/L	A	10, 11

Metals - Field Blank Data Qualification Summary - SDG 10349184

No Sample Data Qualified in this SDG

LDC #: 36509F4a
 SDG #: 10349184
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B/4

Date: 7/12/16
 Page: 1 of 2
 Reviewer: JD
 2nd Reviewer: [Signature]

METHOD: Metals (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	5/12/16
II.	ICP/MS Tune	SW	
III.	Instrument Calibration	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MSD = (27, 28) (29, 30) (31, 32)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	SW	Not reviewed for Stage 2B validation.
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
 N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
 SW = See worksheet FB = Field blank EB = Equipment blank

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	1605GWMMW028-1-U**	Cd, Mn, Fe 10349184001**	Water	05/12/16
2	1605GWMMW023-U**	↓ 10349184003**	Water	05/12/16
3	1605SWMDS034-U	Se 10349184005	Water	05/12/16
4	1605GWMMW022-U**	Cd, Mn, Se 10349184007**	Water	05/12/16
5	1605GWMMW011-U**	↓ 10349184009**	Water	05/12/16
6	1605GWMMW010-U**	↓ 10349184011**	Water	05/12/16
7	1605GWMMW028-2-U	↓ 10349184013	Water	05/12/16
8	1605SWMST226-U**	Se 10349184015**	Water	05/12/16
9	1605SWMST044-U**	Se 10349184017**	Water	05/12/16
10	1605SWMST045-1-U**	Se 10349184019**	Water	05/12/16
11	1605SWMST275-U**	Se 10349184021**	Water	05/12/16
12	1605SWMST136-U	Se 10349184023	Water	05/12/16
13	1605SWMST045-2-U	Se 10349184024	Water	05/12/16
14	1605SWMST045-2-F	Cd, Mn, Ca, Fe 10349184025	Water	05/12/16
15	1605SWMST136-F	↓ 10349184026	Water	05/12/16

LDC #: 36509F4b
 SDG #: 10349184
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET
 Stage 2B/4

Date: 7/5/16
 Page: 2 of 2
 Reviewer: JD
 2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
16	1605GWMMW028-1-F <i>Se</i>	10349184002	Water	05/12/16
17	1605GWMMW023-F <i>Se</i>	10349184004	Water	05/12/16
18	1605SWMDS034-F <i>Ca, Mg, Cd, Se</i>	10349184006	Water	05/12/16
19	1605GWMMW022-F** <i>Se</i>	10349184008**	Water	05/12/16
20	1605GWMMW011-F** <i>Se</i>	10349184010**	Water	05/12/16
21	1605GWMMW010-F** <i>Se</i>	10349184012**	Water	05/12/16
22	1605GWMMW028-2-F** <i>Se</i>	10349184014**	Water	05/12/16
23	1605SWMST226-F** <i>Ca, Mg, Cd, Se</i>	10349184016**	Water	05/12/16
24	1605SWMST044-F** <i>Ca, Mg, Cd, Se</i>	10349184018**	Water	05/12/16
25	1605SWMST045-1-F**	10349184020**	Water	05/12/16
26	1605SWMST275-F** ↓	10349184022**	Water	05/12/16
27	1605SWMST226-UMS <i>Cd, Mn, Se</i>	10349184015MS	Water	05/12/16
28	1605SWMST226-UMSD ↓	10349184015MSD	Water	05/12/16
29	1605SWMST226-FMS <i>Cd, Ca, Mg, Se</i>	10349184016MS	Water	05/12/16
30	1605SWMST226-FMSD ↓	10349184016MSD	Water	05/12/16
31	1605SWMST275-FMS ↓	10349184022MS	Water	05/12/16
32	1605SWMST275-FMSD ↓	10349184022MSD	Water	05/12/16
33				
34				
35				
36				
37				

Notes: _____

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?		/		
Were %RSD of isotopes in the tuning solution $\leq 5\%$?	/			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients ≥ 0.995 ?	/			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/			
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL$ ($\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $\leq 5X$ the RL.	/			
VII. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the %Rs were outside the criteria, was a reanalysis performed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%Ds) < 10%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field duplicates.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
XIII. Field blanks				
Field blanks were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field blanks.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

METHOD: Metals (EPA SW846 Method6020)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y/N/N/A Were all isotopes in the tuning solution mass resolution within 0.1amu?

Y N N/A Were %RSD of isotopes in the tuning solution $\leq 5\%$?

[illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y/N N/A

Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%)?

LEVEL IV ONLY:

Y. N. N/A Was a midrange cyanide standard distilled?

Are all correlation coefficients >0.995 ?

Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

[illegible]

Comments: _____

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

 Code: 3KCB210
 PB211

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)

Sample Concentration units, unless otherwise noted:

Soil preparation factor applied:

Associated Samples: 24, 26

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	24	26								
Cd		0.030	0.032	0.16	0.026	0.022								
Mg		3.7		18.5										

Sample Concentration units, unless otherwise noted:

Associated Samples: 1-13

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	5	9	10	11	13					
Se		0.14		0.7	0.41	0.49	0.56J+	0.23	0.48					

Sample Concentration units, unless otherwise noted:

Associated Samples: 4-7

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	5	7								
Cd		0.013	0.038	0.19		0.023								
Mn		0.38		1.9	0.27									

Sample Concentration units, unless otherwise noted:

Associated Samples: 18 (10X)

					Sample Identification									
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	18									
Cd			0.035	1.75	0.068									

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

 Code: I/CCB=10
 PB=11

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)

Sample Concentration units, unless otherwise noted:

Soil preparation factor applied: _____

Associated Samples: 14-17, 19-23, 25

					Sample Identification							
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	14	17	20	25				
Se		0.23		1.15	0.54J+	0.18	0.50	0.59J+				

Sample Concentration units, unless otherwise noted:

Associated Samples: 14-15, 23, 25

					Sample Identification							
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	14	15	23	25				
Cd		0.34	0.023	1.7	0.027	0.061	0.067	0.018 0.10 30				
Ca		18.3		91.5								
Mg		7.5		37.5								

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

VALIDATION FINDINGS WORKSHEET

Sample Result Verification

METHOD: Metals (EPA SW 846 Method 6010/6020/7000)

[illegible]

Comments: _____

LDC #: 36509F46

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: SD
2nd Reviewer: 9

METHOD: Trace Metals (See cover)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated	Reported	Acceptable (Y/N)
					%R	%R	
	ICP (Initial calibration)						
ICV 7:52	ICP/MS (Initial calibration)	Ca	983.9 ug/L	1000 ug/L	98.4%R	98.4%R	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV 14:29	ICP/MS (Continuing calibration)	Ca	78.91 ug/L	80 ug/L	98.6%R	98.6%R	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibration)						

Comments: _____

LDC #: 36509F46

VALIDATION FINDINGS WORKSHEET

Level IV Recalculation Worksheet

Page: \ of \

Reviewer: JD

2nd Reviewer: _____

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,
 Found = SSR (spiked sample result) - SR (sample result).
 True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I - SDR|}{I} \times 100$$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
ICS AB 8:18	ICP interference check	Se	100.7 ug/L	100 ug/L	100.7%R	100.7%R	Y
LCS 15:09	Laboratory control sample	Mg	2024 ug/L	2000 ug/L	101%R	101%R	
MS 15:04	Matrix spike	Cd (SSR-SR)	99.98 ug/L	100 ug/L	100%R	100%R	
MSD 15:14	Duplicate	Ca	2498 ug/L	2543 ug/L	2%RPD	2%RPD	
SER 15:19	ICP serial dilution	Mg	2301 ug/L	2288 ug/L	0.6%D	0.6%D	Y

Comments: _____

LDC #: 3650954**VALIDATION FINDINGS WORKSHEET**
Sample Calculation VerificationPage: 1 of 1Reviewer: SS2nd reviewer: Ch**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A

Have results been reported and calculated correctly?

Y N N/A

Are results within the calibrated range of the instruments and within the linear range of the ICP?

Y N N/A

Are all detection limits below the CRDL?

Detected analyte results for (4) Cd were recalculated and verified using the following equation:Concentration = $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$

Recalculation:

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

$$RD = 0.58 \mu g/L$$

#	Sample ID	Analyte	Reported Concentration ($\mu g/L$)	Calculated Concentration ($\mu g/L$)	Acceptable (Y/N)
	2	Mn	308	308	Y
	4	Cd	0.58	0.58	Y
	5	Se	0.41	0.41	Y
	6	Cd	5.8	5.8	Y
	8	Se	4.0	4.0	Y
	9	Se	0.49	0.49	Y
	10	Se	0.56	0.56	Y
	11	Se	0.23	0.23	Y
	19	Se	47.8	47.8	Y
	20	Se	0.50	0.50	Y
	21	Se	127	127	Y
	22	Se	4.6	4.6	Y
	23	Ca	50800	50800	Y
	24	Mg	20000	20000	Y
	25	Cd	0.018	0.018	Y
	26	Ca	10400	10400	Y
	1	Cd	0.013	0.013	Y

Note: _____

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: July 6, 2016

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10349184

Sample Identification	Collection Date	Laboratory Sample Identification
1605GWMMW028-1-U	05/12/16	10349184001
1605GWMMW023-U**	05/12/16	10349184003**
1605SWMDS034-U	05/12/16	10349184005
1605GWMMW022-U**	05/12/16	10349184007**
1605GWMMW011-U**	05/12/16	10349184009**
1605GWMMW010-U**	05/12/16	10349184011**
1605GWMMW028-2-U	05/12/16	10349184013
1605SWMST226-U**	05/12/16	10349184015**
1605SWMST044-U**	05/12/16	10349184017**
1605SWMST045-1-U**	05/12/16	10349184019**
1605SWMST275-U**	05/12/16	10349184021**
1605SWMST136-U	05/12/16	10349184023
1605SWMST045-2-U	05/12/16	10349184024
1605SWMST045-2-F	05/12/16	10349184025
1605SWMST136-F	05/12/16	10349184026
1605GWMMW028-1-F	05/12/16	10349184002
1605GWMMW023-F	05/12/16	10349184004
1605SWMDS034-F	05/12/16	10349184006
1605GWMMW022-F**	05/12/16	10349184008**
1605GWMMW011-F**	05/12/16	10349184010**
1605GWMMW010-F**	05/12/16	10349184012**
1605GWMMW028-2-F**	05/12/16	10349184014**
1605SWMST226-F**	05/12/16	10349184016**
1605SWMST044-F**	05/12/16	10349184018**
1605SWMST045-1-F**	05/12/16	10349184020**

Sample Identification	Collection Date	Laboratory Sample Identification
1605SWMST275-F**	05/12/16	10349184022**
1605SWMST226-UDUP	05/12/16	10349184015DUP
1605GWMMW011-FMS	05/12/16	10349184010MS
1605GWMMW011-FMSD	05/12/16	10349184010MSD
1605SWMST226-FMS	05/12/16	10349184016MS
1605SWMST226-FMSD	05/12/16	10349184016MSD

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 31 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the method noted below:

- EPA Method 300.0 for Sulfate and Standard Method 2540C for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UJ | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 2540C) were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
1605GWMMW028-1-U 1605GWMMW023-U** 1605SWMDS034-U 1605GWMMW022-U** 1605GWMMW011-U** 1605GWMMW010-U** 1605GWMMW028-2-U 1605SWMST226-U** 1605SWMST044-U** 1605SWMST045-1-U** 1605SWMST275-U** 1605SWMST136-U 1605SWMST045-2-U	Total dissolved solids	8 days	7 days	J- (all detects)	P

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 6 standard curve produced a coefficient of determination (r^2) of > 0.990. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Sulfate	0.44 mg/L	1605GWMMW028-1-F 1605GWMMW023-F 1605SWMDS034-F 1605GWMMW022-F**
ICB/CCB	Sulfate	0.45 mg/L	1605SWMST045-2-F 1605SWMST136-F 1605SWMST226-F** 1605SWMST044-F** 1605SWMST045-1-F** 1605SWMST275-F**
ICB/CCB	Sulfate	0.42 mg/L	1605GWMMW011-F** 1605GWMMW010-F**

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
1605SWMST275-F**	Sulfate	1.7 mg/L	1.7J+ mg/L

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils) with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
1605GWMMW036-FMS/MSD (1605GWMMW028-1-F 1605GWMMW023-F 1605SWMDS034-F 1605GWMMW022-F**)	Sulfate	76 (90-110)	82 (90-110)	J- (all detects)	A
1605SWMST226-FMS/MSD (1605SWMST045-2-F 1605SWMST136-F 1605GWMMW011-F** 1605GWMMW010-F** 1605GWMMW028-2-F** 1605SWMST226-F** 1605SWMST044-F** 1605SWMST045-1-F** 1605SWMST275-F**)	Sulfate	78 (90-110)	79 (90-110)	J- (all detects)	A

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG 10349184

Sample	Analyte	Flag	A or P	Reason
1605GWMMW028-1-U 1605GWMMW023-U** 1605SWMDS034-U 1605GWMMW022-U** 1605GWMMW011-U** 1605GWMMW010-U** 1605GWMMW028-2-U 1605SWMST226-U** 1605SWMST044-U** 1605SWMST045-1-U** 1605SWMST275-U** 1605SWMST136-U 1605SWMST045-2-U	Total dissolved solids	J- (all detects)	P	Technical holding time (1)
1605SWMST045-2-F 1605SWMST136-F 1605GWMMW028-1-F 1605GWMMW023-F 1605SWMDS034-F 1605GWMMW022-F** 1605GWMMW011-F** 1605GWMMW010-F** 1605GWMMW028-2-F** 1605SWMST226-F** 1605SWMST044-F** 1605SWMST045-1-F** 1605SWMST275-F**	Sulfate	J- (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (16)

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 10349184

Sample	Analyte	Modified Final Concentration	A or P	Code
1605SWMST275-F**	Sulfate	1.7J+ mg/L	A	10

Wet Chemistry - Field Blank Data Qualification Summary - SDG 10349184

No Sample Data Qualified in this SDG

LDC #: 36509F6
 SDG #: 10349184
 Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B/4

Date: 7/5/16
 Page: 2 of 2
 Reviewer: JD
 2nd Reviewer: a

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID	Lab ID	Matrix	Date
18	1605SWMDS034-F	10349184006	Water	05/12/16
19	1605GWMMW022-F**	10349184008**	Water	05/12/16
20	1605GWMMW011-F**	10349184010**	Water	05/12/16
21	1605GWMMW010-F**	10349184012**	Water	05/12/16
22	1605GWMMW028-2-F**	10349184014**	Water	05/12/16
23	1605SWMST226-F**	10349184016**	Water	05/12/16
24	1605SWMST044-F**	10349184018**	Water	05/12/16
25	1605SWMST045-1-F**	10349184020**	Water	05/12/16
26	1605SWMST275-F**	10349184022**	Water	05/12/16
27	1605SWMST226-UDUP	10349184015DUP	Water	05/12/16
28	1605GWMMW011-FMS	10349184010MS	Water	05/12/16
29	1605GWMMW011-FMSD	10349184010MSD	Water	05/12/16
30	1605SWMST226-FMS	10349184016MS	Water	05/12/16
31	1605SWMST226-FMSD	10349184016MSD	Water	05/12/16
32				
33				
34				
35				
36				

Notes:

Method: Inorganics (EPA Method So (over))

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		/		
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients ≥ 0.995 ?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)	/			
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		/		
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\leq \text{CRDL}$ ($\leq 2\text{X CRDL}$ for soil) was used for samples that were $\leq 5\text{X}$ the CRDL, including when only one of the duplicate sample values were $\leq 5\text{X}$ the CRDL.	/			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

LDC #: 34509 EL

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: SD
2nd Reviewer: SD

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were detection limits < RL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field duplicates.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
X. Field blanks				
Field blanks were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field blanks.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

VALIDATION FINDINGS WORKSHEET Blanks

METHOD: Inorganics, Method See Cover

Conc. units: mg/L Associated Samples: 16-19 (17, 19 = 5X; 18 = 2X) (10)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qualifiers									
SO4		0.44	2.2										

Conc. units: mg/L Associated Samples: 14-15, 23-26 (10)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		26									
SO4		0.45	2.25	1.7J+									

Conc. units: mg/L Associated Samples: 20-21 (10)

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No Qualifiers									
SO4		0.42	2.1										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
 All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 36509FL

Validation Findings Worksheet **Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1Reviewer: SSD2nd Reviewer: aMethod: Inorganics, Method See CoverThe correlation coefficient (r) for the calibration of SO₄ was recalculated. Calibration date: 5/23/16

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/l)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial Calibration Verification	SO ₄	s1	1	0.143	0.999978	0.999972	Y*
		s2	2	0.318			
		s3	5	0.894			
		s4	25	5.102			
		s5	50	10.468			
		s6	100	21.079			
ICV 15:06 Calibration verification	↓	Found 12.2mg/L	True 12.5mg/L		97.6%R	98.4%R	Y*
CCV 22:27 Calibration verification		12.3mg/L	12.5mg/L		98.4%R	98.7%R	Y*
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

* Rounding

LDC #: 365094

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page: 1 of 1Reviewer: SD2nd reviewer: AMETHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A

Have results been reported and calculated correctly?

Y N N/A

Are results within the calibrated range of the instruments?

Y N N/A

Are all detection limits below the CRQL?

Compound (analyte) results for _____ reported with a positive detect were recalculated and verified using the following equation:

Concentration = $W_1 - W_2$ Recalculation: $77.4210 \text{ g}/100 \text{ ml} - 77.3678 \text{ g}/100 \text{ ml} = 0.0532 \text{ g}/100$ $W_1 = 77.4210 \text{ g}/100 \text{ ml}$ $W_2 = 77.3678 \text{ g}/100 \text{ ml}$ $0.0532 \text{ g}/100 \text{ ml} \times \frac{10 (100 \text{ ml})}{1} \times \frac{1000 \text{ mg}}{1} = 532 \text{ mg/l}$

#	Sample ID	Analyte	Reported Concentration (mg/l)	Calculated Concentration (mg/l)	Acceptable (Y/N)
	2	TDS	670	670	Y
	4		683	683	
	5		532	532	
	6		1520	1520	
	8		188	188	
	9		373	373	
	10		378	378	
	11		102	102	
	19	SO ₄	273	271	Y*
	20		136	135	
	21		735	733	
	22		68.5	68.2	
	23		24.0	23.8	
	24		61.4	61.3	
	25		61.2	60.8	
	26		1.7	1.9	

Note: _____

The attached zipped file contains seven files:

<u>File</u>	<u>Format</u>	<u>Description</u>	
1) Readme_Monsanto_070716.doc	MS Word 2003	A "Readme" file (this document).	
	MS Excel 2003	<u>SDG</u>	<u>LDC#</u>
2) 10348344.xls		10348344	36509A
3) 10348356.xls		10348356	36509B
4) 10348364.xls		10348364	36509C
5) 10348833.xls		10348833	36509D
6) 10348839.xls		10348839	36509E
7) 10349184.xls		10349184	36509F

No discrepancies were observed between the hardcopy data packages and the electronic data deliverables during EDD population of validation qualifiers. A 100% verification of the EDD was not performed.

Please contact Christina Rink at (760) 827-1100 if you have any questions regarding this electronic data submittal.

LDC #: 36509

EDD POPULATION COMPLETENESS WORKSHEET

Date: 7/7/16Page: 1 of 12nd Reviewer: [Signature]The LDC job number listed above was entered by SE.

	EDD Process		Comments/Action
I.	EDD Completeness	-	
Ia.	- All methods present?	Y	
Ib.	- All samples present/match report?	Y	
Ic.	- All reported analytes present?	Y	
Id.	- 10% or 100% verification of EDD?	Y	
II.	EDD Preparation/Entry	-	
Ila.	- Carryover U/J?	Y	
Ilb.	- Reason Codes used? If so, note which codes	Y	client
Ilc.	-Additional Information (QC Level, Validator, Date, Validated Y/N, etc.)	Y	
III.	Reasonableness Checks	-	
IIIa.	- Do all qualified ND results have ND qualifier (i.e. UJ)?	Y	
IIIb.	- Do all qualified detect results have detect qualifier (i.e. J)?	Y	
IIIc.	- If reason codes used, do all qualified results have reason code field populated?	Y	
IIId.	-Does the detect flag require changing for blank qualifiers? If so, are all U results marked ND?	Y	
IIIe.	- Do blank concentrations in report match EDD, where data was qualified due to blank?	Y	
IIIf.	- Were any results rejected for overall assessment? If so, were results changed to nonreportable?	Y	
IIIg.	- Is the readme complete? If applicable, were edits or discrepancies listed in the readme?	Y	

Notes: _____



LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

MWH Americas, Inc.
2890 East Cottonwood Parkway Suite 300
Salt Lake City, UT 84121
ATTN: Ms. Betty VanPelt

November 17, 2016

SUBJECT: Monsanto, P4 Background, Data Validation

Dear Ms. VanPelt,

Enclosed is the final validation report for the fractions listed below. This SDG was received on October 27, 2016. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #37369:

<u>SDG #</u>	<u>Fraction</u>
10364242	Wet Chemistry, Metals by ICPMS SW-846 Method 6020A

The data verification was performed under Stage 2B & 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- QAPP Addendum, MWH 2009, to the project SAP, April, 2004
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink
Project Manager/Chemist

90/10 2B/4

LDC #37369 (MWH Americas, Inc.-Salt Lake City, UT / Monsanto, P4 Background)

Shaded cells indicate Stage 4 review (all other cells are Stage 2B review and calibration data validation only). These sample counts do not include MS/MSD, and DUPs L:\MWH\Monsanto P4\37369ST.wpd

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: November 16, 2016

Matrix: Water

Parameters: Metals by ICPMS SW-846 Method 6020A

Validation Level: Stage 2B & 4

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10364242

Sample Identification	Collection Date	Laboratory Sample Identification
1609SWMDS025-U**	09/27/16	10364242001**
1609SWMST044-U	09/27/16	10364242003
1609SWMST045-U	09/27/16	10364242005
1609SWMDS030-U	09/27/16	10364242007
NWPOND-U	09/27/16	10364242009
SEPOND-U	09/27/16	10364242011
1609SWMST069-U	09/27/16	10364242013
1609SWMST019-1-U	09/27/16	10364242015
1609SWMST019-2-U	09/27/16	10364242017
1609SWMST020-U	09/27/16	10364242019
1609SWMDS025-F**	09/27/16	10364242002**
1609SWMST044-F	09/27/16	10364242004
1609SWMST045-F	09/27/16	10364242006
1609SWMDS030-F	09/27/16	10364242008
NWPOND-F	09/27/16	10364242010
SEPOND-F	09/27/16	10364242012
1609SWMST069-F	09/27/16	10364242014
1609SWMST019-1-F	09/27/16	10364242016
1609SWMST019-2-F	09/27/16	10364242018
1609SWMST020-F	09/27/16	10364242020
1609SWMDS025-UMS	09/27/16	10364242001MS
1609SWMDS025-UMSD	09/27/16	10364242001MSD
1609SWMDS025-FMS	09/27/16	10364242002MS
1609SWMDS025-FMSD	09/27/16	10364242002MSD

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 20 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the EPA SW 846 Method noted below:

- Method 6020A ICPMS: Cadmium, Calcium, Magnesium, and Selenium.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- | | |
|----|---|
| U | The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. |
| J | The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample. |
| J+ | The result is an estimated quantity, but the result may be biased high. |
| J- | The result is an estimated quantity, but the result may be biased low. |
| R | The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample. |
| UU | The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise. |

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinsate Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements were met: 6 months for water and soil (note NIST soil standard reference samples are valid for up to 3 years).

All samples were received intact with proper preservation (pH < 2 for water).

II. ICP-MS Tune Analysis

ICP MS Tuning was performed by the laboratory. All isotopes in the tuning solution mass resolution were within 0.1 amu. Resolutions are < 0.9 amu full width at 10% peak height.

The percent relative standard deviations (%RSD) of all isotopes in the tuning solution were less than or equal to 5.0%.

III. Calibration

An initial calibration was performed each day of analysis. The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

The low-level initial calibration verification (LLICV) and low-level continuing calibration verifications (LLCCVs) standard frequency and limits (70-130%) were met. Limit for maganese is 50 -150%. Only undetected data, or values < 2 x RL are qualified or impacted.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

ICP interference check samples were reviewed for each analyte as applicable. Percent recovery (%R) of the ICSAB were within the QC limits of 80-120%.

VI. Laboratory Control Sample (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 80-120% limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $<5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VIII. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 75-125% and relative percent differences (RPD) were within 20% limits (35% soils).

IX. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria of $\pm 10\%$ difference for values greater than 50 times the lower limit of quantitation (i.e., the reporting limits [RLs]) were met with the following exception:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
1609SWMDS025-U**	Selenium	11.4 (≤ 10)	1609SWMDS025-U** 1609SWMST044-U 1609SWMST045-U 1609SWMDS030-U NWPOND-U SEPOND-U 1609SWMST069-U 1609SWMST019-1-U 1609SWMST019-2-U 1609SWMST020-U	J (all detects)	A

X. ICP-MS Internal Standards

All internal standard percent recoveries (%R) were within 70-130% or a 2x dilution was run with acceptable recoveries.

XI. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

XII. Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Dissolved Metals - Data Qualification Summary - SDG 10364242

Sample	Analyte	Flag	A or P	Reason (Code)
1609SWMDS025-U** 1609SWMST044-U 1609SWMST045-U 1609SWMDS030-U NWPOND-U SEPOND-U 1609SWMST069-U 1609SWMST019-1-U 1609SWMST019-2-U 1609SWMST020-U	Selenium	J (all detects)	A	Serial dilution (%D) (18)

Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 10364242

No Sample Data Qualified in this SDG

Dissolved Metals - Field Blank Data Qualification Summary - SDG 10364242

No Sample Data Qualified in this SDG

LDC #: 37369A4a
SDG #: 10364242
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET Stage 2B/4

Date: 11/9/16
Page: 1 of 2
Reviewer: JS
2nd Reviewer: [Signature]

METHOD: Metals (EPA SW 846 Method 6020A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	9/27/16
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	A	
VI.	Field Blanks	N	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MSD = (21.22) (23.24); (23.24) = Ca, Mg 4x
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	SW	SEP = (1) (1)
X.	Laboratory control samples	A	LCS
XI.	Field Duplicates	N	Not Evaluated
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	A	Not reviewed for Stage 2B validation.
XIV.	Overall Assessment of Data	A	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB = Source blank
OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	1609SWMDS025-U**	10364242001**	Water	09/27/16
2	1609SWMST044-U	10364242003	Water	09/27/16
3	1609SWMST045-U	10364242005	Water	09/27/16
4	1609SWMDS030-U	10364242007	Water	09/27/16
5	NWPOND-U	10364242009	Water	09/27/16
6	SEPOND-U	10364242011	Water	09/27/16
7	1609SWMST069-U	10364242013	Water	09/27/16
8	1609SWMST019-1-U	10364242015	Water	09/27/16
9	1609SWMST019-2-U	10364242017	Water	09/27/16
10	1609SWMST020-U	10364242019	Water	09/27/16
11	1609SWMDS025-F**	10364242002**	Water	09/27/16
12	1609SWMST044-F	10364242004	Water	09/27/16
13	1609SWMST045-F	10364242006	Water	09/27/16
14	1609SWMDS030-F	10364242008	Water	09/27/16
15	NWPOND-F	10364242010	Water	09/27/16

LDC #: 37369A4a
SDG #: 10364242
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

Date: 11/9/16
Page: 2 of 2
Reviewer: SS
2nd Reviewer: Q

METHOD: Metals (EPA SW 846 Method 6020A)

	Client ID	Lab ID	Matrix	Date
16	SEPOND-F	10364242012	Water	09/27/16
17	1609SWMST069-F	10364242014	Water	09/27/16
18	1609SWMST019-1-F	10364242016	Water	09/27/16
19	1609SWMST019-2-F	10364242018	Water	09/27/16
20	1609SWMST020-F	10364242020	Water	09/27/16
21	1609SWMDS025-UMS	10364242001MS	Water	09/27/16
22	1609SWMDS025-UMSD	10364242001MSD	Water	09/27/16
23	1609SWMDS025-FMS	10364242002MS	Water	09/27/16
24	1609SWMDS025-FMSD	10364242002MSD	Water	09/27/16
25				
26				
27				
28				
29				

Notes: _____

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution $\leq 5\%$?	/			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients ≥ 0.995 ?	/			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL$ ($\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $\leq 5X$ the RL.	/			
VII. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the %Rs were outside the criteria, was a reanalysis performed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%Ds) < 10%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Target analytes were detected in the field duplicates.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
XIII. Field blanks				
Field blanks were identified in this SDG.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Target analytes were detected in the field blanks.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

LDC #: 37369A49

VALIDATION FINDINGS WORKSHEET

Sample Specific Element Reference

Page: \ of \

Reviewer: SS

2nd reviewer:

All circled elements are applicable to each sample.

[illegible]

Comments: Mercury by CVAA if performed

VALIDATION FINDINGS WORKSHEET **Initial and Continuing Calibration Calculation Verification**

METHOD: Trace Metals (See cover)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
 True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated	Reported	Acceptable (Y/N)
					%R	%R	
	ICP (Initial calibration)						
ICV 6:51	ICP/MS (Initial calibration)	Se	77.48 ug/L	80 ug/L	96.9 %R	96.8 %R	Y*
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
CCV 14:56	ICP/MS (Continuing calibration)	Ca	77.07 ug/L	80 ug/L	96.3 %R	96.3 %R	Y
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibration)						

Comments: *Rounding

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
 True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where, S = Original sample concentration
 D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$

Where, I = Initial Sample Result (mg/L)
 SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
ICS AB 7:20	ICP interference check	Se	95.68 ug/L	100 ug/L	95.7%R	95.7%R	Y
LCS 15:47	Laboratory control sample	Ca	2047 ug/L	2000 ug/L	102%R	102%R	Y
MS 19:15	Matrix spike	Se	(SSR-SR) 108.4 ug/L	100 ug/L	108%R	108%R	Y
MSD 15:42	Duplicate	Cd	100.1 ug/L	99.5 ug/L	1%RPD	0%RPD	Y*
SEP 19:25	ICP serial dilution	Se	98.00 ug/L	87.96 ug/L	11.4%D	11.4%D	Y

Comments: *Rounding

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Monsanto, P4 Production LLC

Report Date: November 15, 2016

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B & 4

Laboratory: Pace Analytical

Sample Delivery Group (SDG): 10364242

Sample Identification	Collection Date	Laboratory Sample Identification
1609SWMDS025-U**	09/27/16	10364242001**
1609SWMST044-U	09/27/16	10364242003
1609SWMST045-U	09/27/16	10364242005
1609SWMDS030-U	09/27/16	10364242007
NWPOND-U	09/27/16	10364242009
SEPOND-U	09/27/16	10364242011
1609SWMST069-U	09/27/16	10364242013
1609SWMST019-1-U	09/27/16	10364242015
1609SWMST019-2-U	09/27/16	10364242017
1609SWMST020-U	09/27/16	10364242019
1609SWMDS025-F**	09/27/16	10364242002**
1609SWMST044-F	09/27/16	10364242004
1609SWMST045-F	09/27/16	10364242006
1609SWMDS030-F	09/27/16	10364242008
NWPOND-F	09/27/16	10364242010
SEPOND-F	09/27/16	10364242012
1609SWMST069-F	09/27/16	10364242014
1609SWMST019-1-F	09/27/16	10364242016
1609SWMST019-2-F	09/27/16	10364242018
1609SWMST020-F	09/27/16	10364242020
1609SWMDS025-FMS	09/27/16	10364242002MS
1609SWMDS025-FMSD	09/27/16	10364242002MSD
1609SWMST044-UDUP	09/27/16	10364242003DUP
1609SWMST045-UDUP	09/27/16	10364242005DUP

**Indicates sample underwent Stage 4 review.

Introduction

This data review covers 20 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analysis was performed per the method noted below:

- EPA Method 300.0 for Sulfate and EPA Method 160.1 for Total Dissolved Solids.

This review follows the specific guidance in the QAPP Addendum (MWH 2009) to the project SAP (April, 2004) using the intent of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as applicable to the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were reviewed for a minimum of 10% of the Sample Delivery Groups (SDGs) or laboratory data package deliverables associated with this sampling event as specified in the QAPP Addendum. This package includes raw data review.

The following are definitions of the data qualifiers:

- U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximated concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- R The result is unusable. The sample result is rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.
- UU The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

The following are not data qualifiers but are provided for the purpose of evaluating the laboratory's performance:

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

The following "Reason Codes" will be applied as applicable to the validated data:

- 1 Holding Time
- 2 Sample Preservation (including receipt temperature)
- 3 Sample Custody
- 4 Missing Deliverable
- 5 ICPMS Tune
- 6 Initial Calibration
- 7 Initial Calibration Verification
- 8 Continuing Calibration Verification
- 9 Low-Level Calibration Check Sample
- 10 Calibration Blank
- 11 Laboratory or Preparation Blank
- 12 ICPMS or ICP Interference Check Standard
- 13 Laboratory Control Sample or Laboratory Control Sample Duplicate Recovery
- 14 Laboratory Control Sample Precision
- 15 Laboratory Duplicate Precision
- 16 Matrix Spike or Matrix Spike Duplicate Recovery
- 17 Matrix Spike/Matrix Spike Duplicate Precision
- 18 ICPMS or ICP Serial Dilution
- 19 ICPMS Internal Standard
- 20 Field Replicate Precision
- 21 Equipment Rinse Blank
- 22 Linear Range Exceeded
- 23 Other reason
- 26 Source Water Blank

I(a). Deliverables and Chain-of-Custody Documentation

All deliverables were present and complete including the Case Narrative with full explanation of corrective actions and all package deliverables defined in the project SAP.

The chain-of-custodies were complete for sample identification, matrix, methods, preservation, dates and times of collection, dates and times of relinquishment and receipt. Any corrections performed properly (i.e., crossed-out with a single line; correction visible, neat, and clear; and with initials of individual making correction).

I(b). Preservation and Holding Times

All technical holding time requirements (28 days for method 300.0 and 7 days for method 2540C) were met.

All samples were received intact (preserved as required according to each method).

II. Calibration

An initial calibration was performed each day of analysis. The blank plus 6 standard curve produced a coefficient of determination (r^2) of > 0.990 . The frequency and analysis criteria (90-110%) of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Laboratory Control Sample (LCS)

Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within the QC limits of 80-120% and relative percent differences (RPD) were within 20% limits.

V. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPDs) were within the acceptance criteria of $\leq 20\%$ for water or $\leq 35\%$ for soil. For low level results, $< 5 \times \text{RL}$, a difference of $\pm 1 \times \text{RL}$ is allowed for water and $\pm 2 \times \text{RL}$ for soils.

VI. Spike Sample Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Spike amounts were reviewed and concentrations are noted to be at or near the mid-point of the calibration. Percent recoveries (%R) were within 90-110% (80-120% TDS) and relative percent differences (RPD) were within 20% limits (35% soils).

VII. Field Replicates

Field replicate samples were collected in duplicate. Control limit(s) were not established in the SAP since the average of the replicate samples is used as the final value for the field location. Results of field replicate samples or other project samples were not qualified based on the precision of field replicate samples.

VIII(a). Sample Result Verification

All sample result verifications were acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

VIII(b). Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

Wet Chemistry - Data Qualification Summary - SDG 10364242

No Sample Data Qualified in this SDG

Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 10364242

No Sample Data Qualified in this SDG

Wet Chemistry - Field Blank Data Qualification Summary - SDG 10364242

No Sample Data Qualified in this SDG

LDC #: 37369A6
SDG #: 10364242
Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 11/21/16
Page: 1 of 2
Reviewer: [Signature]
2nd Reviewer: [Signature]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	9/27/16
II.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Laboratory Blanks	A	
V.	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	MSD = (21.22)
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	Not evaluated
X.	Sample result verification	A	Not reviewed for Stage 2B validation
XI.	Overall assessment of data	A	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank
OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	1609SWMDS025-U**	10364242001**	Water	09/27/16
2	1609SWMST044-U	10364242003	Water	09/27/16
3	1609SWMST045-U	10364242005	Water	09/27/16
4	1609SWMDS030-U	10364242007	Water	09/27/16
5	NWPOND-U	10364242009	Water	09/27/16
6	SEPOND-U	10364242011	Water	09/27/16
7	1609SWMST069-U	10364242013	Water	09/27/16
8	1609SWMST019-1-U	10364242015	Water	09/27/16
9	1609SWMST019-2-U	10364242017	Water	09/27/16
10	1609SWMST020-U	10364242019	Water	09/27/16
11	1609SWMDS025-F**	10364242002**	Water	09/27/16
12	1609SWMST044-F	10364242004	Water	09/27/16
13	1609SWMST045-F	10364242006	Water	09/27/16
14	1609SWMDS030-F	10364242008	Water	09/27/16
15	NWPOND-F	10364242010	Water	09/27/16
16	SEPOND-F	10364242012	Water	09/27/16
17	1609SWMST069-F	10364242014	Water	09/27/16

LDC #: 37369A6

SDG #: 10364242

Laboratory: Pace Analytical

VALIDATION COMPLETENESS WORKSHEET

Stage 2B/4

Date: 11/1/16

Page: 2 of 2

Reviewer: [Signature]

2nd Reviewer: [Signature]

METHOD: (Analyte) Sulfate (EPA Method 300.0), TDS (EPA Method 160.1)

	Client ID	Lab ID	Matrix	Date
18	1609SWMST019-1-F	10364242016	Water	09/27/16
19	1609SWMST019-2-F	10364242018	Water	09/27/16
20	1609SWMST020-F	10364242020	Water	09/27/16
21	1609SWMDS025-FMS	10364242002MS	Water	09/27/16
22	1609SWMDS025-FMSD	10364242002MSD	Water	09/27/16
23	1609SWMST044-UDUP	10364242003DUP	Water	09/27/16
24	1609SWMST045-UDUP	10364242005DUP	Water	09/27/16
25				
26				
27				
28				
29				

Notes:

Method: Inorganics (EPA Method Soil (over))

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients > 0.995 ?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)	/			
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\leq \text{CRDL} (\leq 2\text{X CRDL for soil})$ was used for samples that were $\leq 5\text{X the CRDL}$, including when only one of the duplicate sample values were $\leq 5\text{X the CRDL}$.	/			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

LDC #: 373691A16

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: SD
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
Were detection limits < RL?	/			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.			/	
Target analytes were detected in the field duplicates.			/	
X. Field blanks				
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.			/	

LDC #: 37369AC

Validation Findings Worksheet

Initial and Continuing Calibration Calculation Verification

Page: 1 of 1Reviewer: SD2nd Reviewer: aMethod: Inorganics, Method See CoerThe correlation coefficient (r) for the calibration of SO₄ was recalculated. Calibration date: 8/9/10

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where,

Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/l)	Area	Recalculated	Reported	Acceptable (Y/N)
					r or r ²	r or r ²	
Initial Calibration Verification	<u>SO₄</u>	s1	1	0.125	0.999963	0.999945	Y*
		s2	2	0.278			
		s3	5	0.847			
		s4	25	5.041			
		s5	50	10.335			
		s6	100	20.545			
ICV <u>11:08</u> Calibration verification	↓	<u>Found</u> 12.17mg/L	<u>True</u> 12.5mg/L		97.4%R	98.2%R	Y*
CCV <u>18:22</u> Calibration verification		12.5mg/L	12.5mg/L		100.0%R	101.0%R	Y*
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. *Rounding

LDC #: 37369AB

VALIDATION FINDINGS WORKSHEET

Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: JD
2nd Reviewer: G

METHOD: Inorganics, Method See Cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = $\frac{\text{Found}}{\text{True}} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$\text{RPD} = \frac{|S-D|}{(S+D)/2} \times 100$

Where,

S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	TDS	484mg/L	500mg/L	97%R	97%R	Y
MS 20:56	Matrix spike sample	SO ₄	(SSR-SR) 221mg/L	250mg/L	88%R	89%R	Y*
DUP 21:18	Duplicate sample	TDS	954mg/L	956mg/L	0%RPD	0%RPD	Y

Comments: *Bonding

LDC #: 37369AX

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page: 1 of 1

Reviewer: JD

2nd reviewer: _____

METHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A

Have results been reported and calculated correctly?

Y N N/A

Are results within the calibrated range of the instruments?

Y	N	N/A
---	---	-----

Are all detection limits below the CRQL?

Compound (analyte) results for (1) TDS reported with a positive detect were recalculated and verified using the following equation:

$$\text{Concentration} = w_1 - w_2$$

Recalculation: $75.527 \text{ g} / 25 \text{ ml} - 75.4918 \text{ g} / 25 \text{ ml} = 0.036 \text{ g} / \text{L}$

$$W_1 = 75.5279 \text{ g/25ml}$$

$$w_2 = 75.4918 \text{ g/25ml}$$

$$0.0361 \text{ g} / 25 \text{ ml} \times \frac{(40)(25 \text{ ml})}{1} \times \frac{1000 \text{ mg}}{1 \text{ g}} = 1440 \text{ mg/l}$$

[illegible]

Note:

* Rounding

The attached zipped file contains two files:

<u>File</u>	<u>Format</u>	<u>Description</u>				
1) Readme_Monsanto_111716.doc	MS Word	A "Readme" file (this document).				
2) 10364242.xls	MS Excel	<table><thead><tr><th><u>SDG</u></th><th><u>LDC#</u></th></tr></thead><tbody><tr><td>10364242</td><td>37369A</td></tr></tbody></table>	<u>SDG</u>	<u>LDC#</u>	10364242	37369A
<u>SDG</u>	<u>LDC#</u>					
10364242	37369A					

No discrepancies were observed between the hardcopy data packages and the electronic data deliverables during EDD population of validation qualifiers. A 100% verification of the EDD was not performed.

Please contact Christina Rink at (760) 827-1100 if you have any questions regarding this electronic data submittal.